NOVEMBER 1, 1982

IRON AGE

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POLLUTION CONTROL:

Steel writes its ~~last~~ chapter.

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IRON AGE

NOVEMBER 1, 1982

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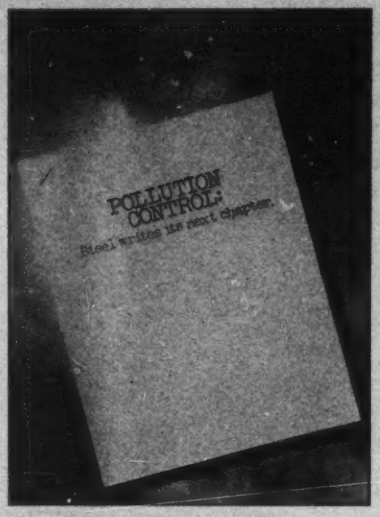

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STEEL WRITES THE FINAL CHAPTER ON POLLUTION CONTROL

By the end of 1984 the industry will have $10.8 billion worth of cleanup equipment installed and will capture 95 pct of emissions.

By George J. McManus

Steel companies may finally be nearing the end of the road in their long struggle to satisfy environmental requirements.

December 13, 1982, is the deadline for meeting air quality standards. Bethlehem Steel Corp. expects to be in compliance at all locations by that date.

Armco Inc. has successfully applied the bubble concept at its Middletown, Ohio, plant. Others are in the process of "bubbling" their remaining air and water emissions.

This would suggest the steel industry is in the last leg of its cleanup effort. Individual companies certainly seem to be in the homestretch.

"That's true with respect to the 1982 deadlines," says David Anderson, corporate director of environmental affairs for Bethlehem.

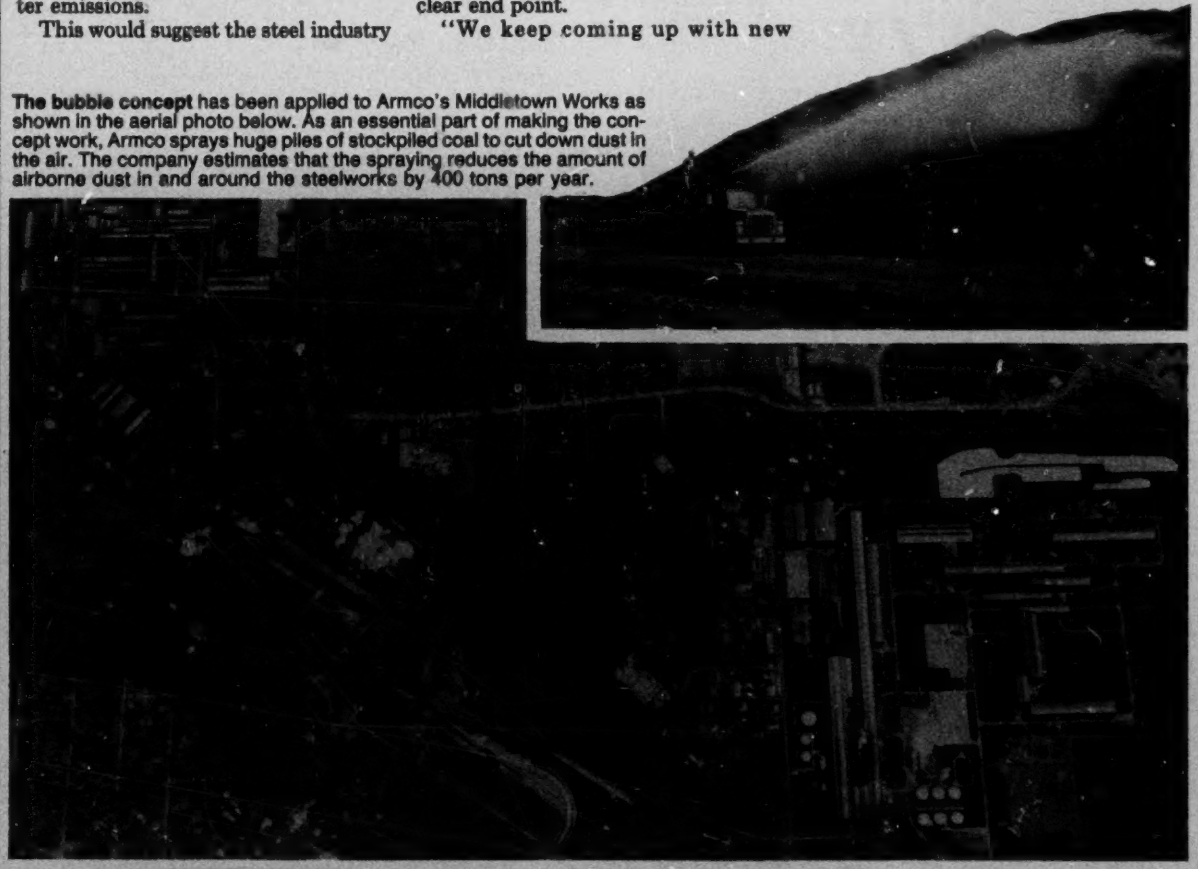
"Every year I ask myself that question," says John Barker, manager of environmental engineering for Armco.

Neither Mr. Barker nor Mr. Anderson are ready to give an unqualified answer. The environmental picture is too complicated and fluid for there to be a clear end point.

"We keep coming up with new things," says Donald Lang, director of air and water pollution control for Inland Steel Co. "I think we'll see increased emphasis on toxic substances."

In both air and water control, steel producers may see new sets of standards and deadlines. Existing health standards are now being reviewed by the Clean Air Scientific Advisory Committee. Steel producers hope the review brings an easing of requirements, but the effect could be just the opposite.

At some unspecified time in the future, the states are supposed to come up



The bubble concept has been applied to Armco's Middletown Works as shown in the aerial photo below. As an essential part of making the concept work, Armco sprays huge piles of stockpiled coal to cut down dust in the air. The company estimates that the spraying reduces the amount of airborne dust in and around the steelworks by 400 tons per year.

with secondary air standards, related to environmental aesthetics or welfare. These could be more stringent than the health standards now in effect. An Arthur D. Little study for the American Iron & Steel Institute (AISI) said it could cost another $7.7 billion for steel mills to meet all future requirements.

There is much uncertainty and considerable potential for large additional costs. Steel producers have reason to be wary. The environmental movement has lost some of its hysteria, but there is now a large network of government regulators and there is a hardened corps of environmental pressure groups.

Nevertheless, it is a fact that steel companies will have $10.8 billion worth of cleanup equipment installed by the end of 1984. Most of the pollutants—95 pct or more—are being captured. As Bethlehem's compliance suggests, steel companies are finding ways to meet air standards without muzzling the final expensive fraction of process dust.

In line with this, the regulatory trend seems toward more cost-effective means of dealing with pollution. Separating the worst fears of steel producers from the probable course of events, it may not be too wishful to suggest that steel environment costs have peaked out.

The immediate problem is that a rigid body of law is being administered by a vast bureaucracy. Faced with a static mass of legislation and regulation, companies are being told they must hurry to meet inflexible deadlines.

The difficulties in this regard are brought out by the deadline of July, 1984, for installing the best available water technology. That date was set on the assumption that the best technology would be identified in 1980. The effluent regulations for steel didn't come out until May of 1982. Steel producers argue there should be a corresponding delay in the compliance deadline.

"We wanted 42 months from the time they were imposed," says Earl Young, AISI vice president.

The Clean Water Act is up for re-authorization this year, and the Reagan Administration has submitted a package of amendments. Some steel producers hope a deadline change will be legislated. Mr. Young is not optimistic.

"I don't think there's any chance," he says.

A similar conflict exists on air cleanliness. Many states are still trying to come up with acceptable compliance plans. Despite the absence of these plans, the deadline for compliance remains at Dec. 31 of this year. Efforts to change the final date failed last year, and it's not expected there will be new legislation in 1982. (Cont. on p. MP-9)

ANNUAL CAPITAL REQUIREMENTS OF THE AMERICAN STEEL INDUSTRY

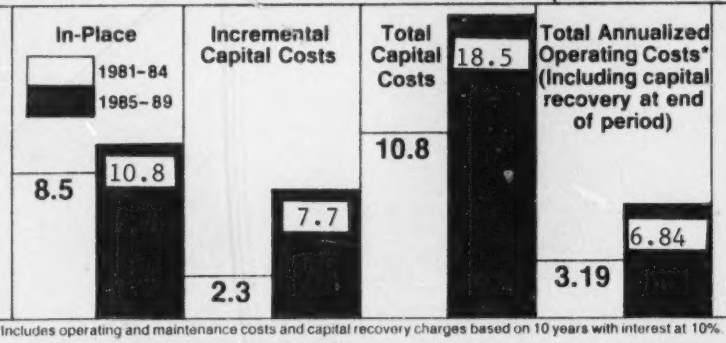
(Billions of 1980 Dollars)

Capital Expenditures	Current Requirements Through 1984	Projected Future Requirements Through 1989
Replacement and Modernization of Present Steel Capacity	5.5	6.1
Non-steel	0.9	0.9
Industrial Health	0.1	0.1
Environmental Control	0.6	1.5
Total Capital Expenditures	7.1	8.6
Other Capital Requirements		
Increases in Working Capital	0.1	0.1
Average Annual Capital Requirements	7.2	8.7
Capital Formation	4.3 (approx.)	5.6 (approx.)
Capital Shortfall*	2.9 (approx.)	3.1 (approx.)

*Including capital expenditures for environmental control. Source: Arthur D. Little, Inc.

Total Annualized Operating Costs

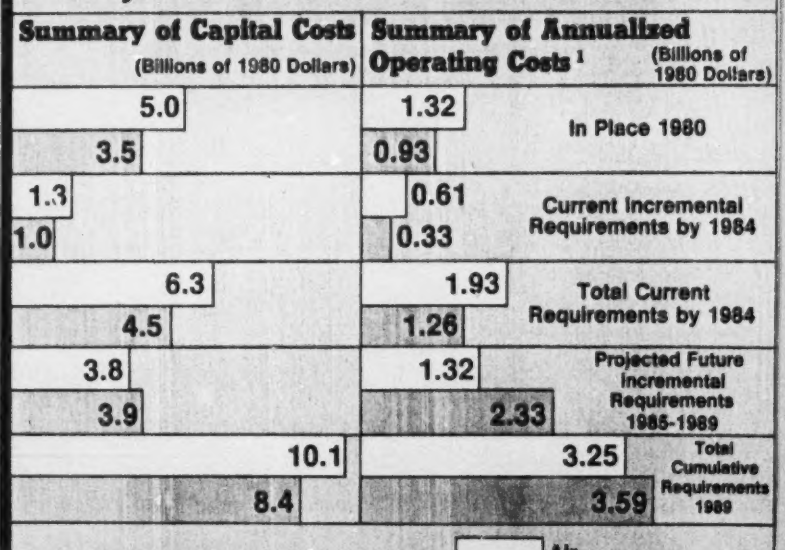
(Billions of Dollars)



*Includes operating and maintenance costs and capital recovery charges based on 10 years with interest at 10%.

By 1989, therefore, the U.S. steel industry, under the worst-case scenario authorized in these statutes, would have total capital costs of $18.5 billion and total annualized operating costs of $6.84 billion for environmental controls, the majority of which would be required to comply with meeting non-health related standards.

Projected Environmental Controls Costs



[1]Includes capital recovery charges
Arthur D. Little, Inc.

Big steel shares a shoreline with a national park

Since ground was broken in December 1962, Bethlehem Steel Corp. has spent nearly $1.7 billion in developing its Burns Harbor, Ind. plant. Of that sum, about $144 million—or $1 out of every $12—went toward modernizing its pollution control facilities.

The payoff is a plant that can now produce about 5.3 million tons of steel annually and, at the same time, share a boundary with a major national park—the Indiana Dunes National Lakeshore.

Its waste water treatment system is so effective, in fact, that clean water returning from the plant to Lake Michigan has no adverse effects on the stream through which the water passes.

Boating and fishing are now thriving sports, something the stream couldn't support before the water treatment system began operating.

Much of the water used at Burns Harbor is for cooling, some of which is recirculated in closed systems. As such, it doesn't contact pollutants.

Process contact water and discharges from wet air pollution control systems are treated in a tertiary or three-step cleaning process. First, dirty water is treated near its place of use—in the scale pits at the rolling mills, for example. Next, it's pumped to a central secondary treatment plant for further cleaning. Finally, the water flows through a 40-acre "polishing" lagoon.

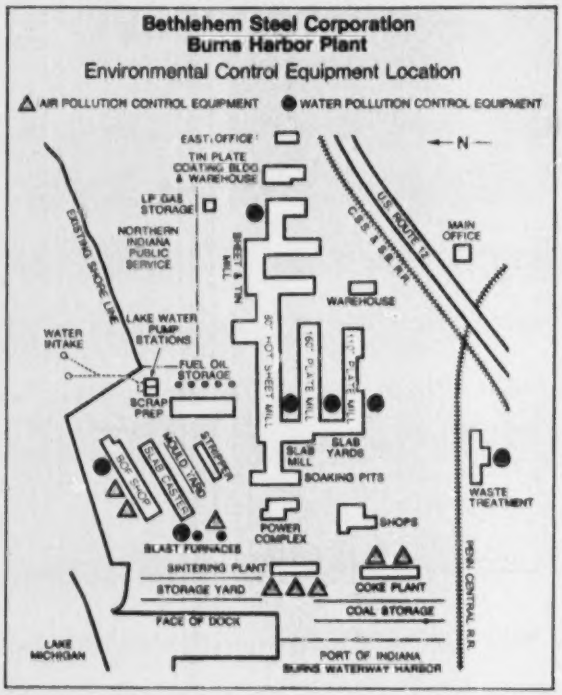
Only after the tertiary cleaning treatment is the water suitable for its journey down the Little Calumet River. But not all of it goes to the river. About 21 million gallons is pumped from the lagoon to various plant facilities. This recycling system started in 1978 and had a price tag of $6 million.

Just as much care goes into air pollution control. Conveyor belts between material storage areas and blast furnaces are enclosed to keep dust down. Blast furnace gases pass through high-energy scrubbers then used at other plant facilities.

Emissions from basic oxygen furnaces are captured in water-cooled hoods, then cleaned in scrubber systems. Fumes generated when hot metal is poured are also cleaned in a baghouse.

But the most difficult problem involved the coke ovens. Various systems were tried unsuccessfully. Finally, this problem, too, was solved, using two separate control systems. One is a "one spot car pushing" that traps emissions when coke is pushed from the ovens and cleans them in a high-energy Venturi scrubber system. The second is "stage charging," which reduces emissions when coal is charged into the ovens.

Pollutant materials captured in the air and water cleaning processes are recycled. Iron-bearing dust and mill scale are fed back into the blast furnaces. Gases from cokemaking and ironmaking are used at various plant locations as, for example, the plant's power station to generate steam and electricity.



By-products from cokemaking are sold to companies that make a host of products including synthetic fibers, perfume, paints, dyes and others.

Steelmaking is an inherently dirty process. But the Burns Harbor plant proves that large tonnage steel production and a clean environment can co-exist.

It may be that the Congressional stalemate is the lesser of two evils. "It began to look as though any changes would be bad," says Mr. Young.

That doesn't mean the current outlook is good. "Portions of the country are going to be operating without any clear guidelines," says Mr. Barker of Armco. "The country's illegal, I guess."

This could be a serious matter even for plants that have met requirements. The Environmental Protection Agency (EPA) is reportedly planning to ban heavy industrial construction in nonattainment areas after Dec. 31.

"Given the state of the steel industry," says Dr. Anderson, "that is not a serious problem. I wish it were." No one is likely to start building a greenfield steel plant in 1983. However, the steel market would be affected if EPA halted the construction of new power plants, oil refineries and the like. A cutoff of Federal funds for highway and bridge construction would also hurt.

The time factor comes into play in specific enforcement actions. It will probably take time for top level policy changes to be implemented. Under Anne Gorsuch as administrator, EPA has moved toward more reasonable policies. As a result of a change this year, the bubble concept can now be applied in non-attainment areas. The steel guidelines established in July allow the bubble to be used for water.

Some of the widely publicized concessions need to be put in perspective. When EPA released its guidelines for steel plant effluents, the agency said compliance would have about a third of the cost of compliance under regulations proposed during the Carter Administration.

"I think that's right," says Dr. Anderson, but he adds that the industry's estimate of costs under the original rules was double that of EPA. The reduction brings costs down to about where EPA said they would be in the first place.

The steel stretch-out provision passed by Congress in July has so many hookers that some steel companies are backing away from this.

Steel producers are cautious about proclaiming a new era, but they acknowledge there has been a high level shift at EPA toward greater flexibility. "There's been an attempt to make standards more reasonable and to apply them in a more reasonable way," says Dr. Anderson.

(Cont. on p. MP-11)

Steel's Environmental Experts and Some Opinions About Pollution Control

A look at steel environmental control throughout the world was provided in June of 1979 by a symposium of the International Iron and Steel Institute. The following are excerpted from selected papers:

Coke Ovens—P. X. Marciantonio, director, environmental control, United States Steel Corp.

"Examination source by source . . . would indicate that charging emissions can be effectively reduced by available technology as much as 95 pct or more.

"The control of pushing emissions with technology now being demonstrated suggest about 90 pct reduction or more with capture systems although some improvement in reliability still clearly is needed.

"Door emissions probably have been improved by about 95 pct or more using mechanical design and operating practices that have been developed.

"Topside emissions can be essentially eliminated from lids with diligent attention to sealing and cleaning practices. With regard to offtake piping, there may be need for design changes in certain components of the offtake piping but there has been about a 90 pct improvement in recent years by installation of operatiing practices and design changes.

Recycling Iron Wastes—Y. Yamada, technical cooperation department, engineering division, Sumitomo Metal Industries, Inc.

"During the first quarter of 1978, 49,281 tons of in-plant fines (dry base) were generated while approximately 1.2 million tons of crude steel were produced. (Disposal entailed careful handling and sometimes the forming of dust into concrete blocks at a cost of 8,000 yens a ton).

"The Sumitomo Dust Reduction plant (SDR) is now treating the fines not only generated in Wakayama Steel Works but also those in another steelworks . . . Carbon coming from the blast furnace acts as a reductant in the rotary kiln but the amount is not enough to reduce all the oxides and therefore some amount of coke fines is added into the slurry basins.

". . . the material is pelletized in the balling disc where some water is sprayed. Preheated pellets are then fed to a rotary kiln where iron oxide is reduced and undesirable elements such as zinc, lead, and alkalis are eliminated. The pellets over 5mm are fed to the blast furnace while those below 5mm are utilized in the sinter plant.

"The treatment cost cannot be covered by the value of recovered iron but compared with the other process which insure similar satisfactory treatment, this process may be the most beneficial one."

Sinter plant—Y. Watanabe, manager, technical section, Environmental Control Offices, Nippon Steel Corp.

". . . the sintering plant is the largest source of dust emission at a steel works. In the past, the cyclones installed at the time of plant construction had been used to clean the main exhausts at most sintering plants. Because of low dust collecting efficiency, however, the dust emission level by these cyclones was around 0.3 g/Nm. Although conventional electrostatic precipitators were in use at some plants, their performance was not satisfactory.

"In these circumstances, Nippon Steel developed a super-high voltage electrostatic precipitator called "electrostatic space clear super (ESCS)" to attain a high dust collecting efficency for sinter dust. At present, more than 10 ESCS's are in operation at its steel works. A variety of techniques have been developed based on the results of their excellent operation over five years."

Rolling mills—Water treatment—G. H. G. Layt, vice president operations, STELCO Inc.

"Development of chemical flocculating agents, use of air flotation, increased use of recirculating systems, more effective skimming systems, and the addition of mechanical filtration have all contributed to improved control of quality of process effluents. These developments involved significant research and capital expenditures and additional production costs.

". . . although reasonably effective methods are available for the removal of pollutants from water used in steel rolling mills, work is continuing to develop systems which can meet the increasingly stringent standards and be acceptable from the capital and operating cost point of view."

It isn't clear that the policy changes have yet filtered down through the ranks of EPA. The agency has about 9,000 full-time people and employs another 3,000 for consulting and other part-time functions. An organization of this size is not likely to change directions overnight.

"I don't see any significant change except a greater willingness to talk," said Mr. Barker.

"I think EPA is taking a more flexible view in some cases," says Donald Lang, director of air and water pollution control for Inland Steel Co.

"When it comes to individual facilities, they haven't relaxed their effort," adds Mr. Lang. "We've come in for increased surveillance."

Dr. Anderson feels it's too soon for a final judgement. "The proof of the pudding is going to be in the enforcement and negotiations," he says. "The preliminary indication is there will be no change at all."

The absence of change is indicated by the slow progress in having bubble plans approved. The basic idea was first put forward in December of 1979. The soundness of the principle has since been demonstrated by Armco's experience.

"It's done everything we expected and a little better," says Mr. Barker.

Yet, nearly three years after the doctrine was authorized, only one or two steel bubbles have been approved. Part of the delay was due to the early exclusion of non-attainment areas. Even with the policy change, however, it is difficult to implement bubble plans. State, regional, and Federal approval must be obtained. Under the 'expedited' procedure of EPA, the Federal step, alone, takes six months.

One reason the 1984 water deadline is considered so tight is that much of the time will be used up in getting clearance for cleanup projects. Companies must obtain National Pollution Discharge Elimination System permits. It will probably be 1983 before these can be secured.

It should be said that EPA is caught in the middle on all controversial issues. Any easing of regulation is certain to bring cries of outrage and legal challenges from the army of private environmental groups.

Use of the bubble in non-attainment areas was challenged in the courts by two environmental groups and by the Northeast Ohio Lung Assn. The ruling handed down simply said that new sources could not be exempted from specific emission requirements because they were included in bubbles.

Fortune magazine recently reported that there are now over 80 registered environmental lobbyists in Washington. Taken together, said *Fortune*, four large environmental groups employ some 50 lawyers. A cynic might say that a lot of people would be out of work if it ever became apparent

pollution problems had been licked.

Anne Gorsuch has taken a lot of heat from environmentalists for EPA budget cuts and policy changes. This is said to be one reason EPA plans to take a hard line on state compliance with the clean air deadline. The aim, supposedly, is to draw companies into the Washington battle.

Up and down the line, EPA administrators are sensitive to charges that they are soft on big business. When a company announces a cleanup project, the announcement is likely to come from EPA. When a concession is made by the agency, there probably won't be an announcement. Two large steel companies recently declined to discuss their environmental programs on the grounds that public disclosures would rock the boat.

Apart from politics and pressures, a certain amount of delay seems inherent in environmental technology. This makes it difficult to link cause and effect. Steel companies have long contended that they are getting blamed for pollution caused by roads, farm lands and other non-traditional sources.

"The background is accounting for half the standard," says Mr. Lang of Inland.

The 1982 recession seemed to present a golden opportunity for documenting this position. Steelmaking operations have fallen to about 40 pct of capacity. In the Pittsburgh area, United States Steel Corp. has been operating only one blast furnace.

If steel processes were causing a large portion of total pollution, you would expect the steel cutbacks to bring a significant drop in pollution. If there is little or no change in total pollution, it would show that steelmaking doesn't account for a large part of the total.

Unfortunately, no one seems to know what is happening to air quality right now. "The time frame is too short," says Mr. Barker. Things like weather conditions and wind changes make it impossible to identify quality trends in just a few days or weeks, he indicates.

When enough data has been collected, there is then a long delay while this is being interpreted. "We're just getting reports on what air quality was in 1981," says Dr. Anderson.

Some very minute technical details can have momentous consequences for steel companies and others. Ever since the Clean Air Act was passed in 1969, steel companies have argued that the particulate standard was unnecessarily tight. The Act calls for regular review of standards and after AISI brought suit, EPA said it would take another look.

A review is now being conducted by the Clean Air Scientific Advisory Committee. It's expected the new particulate standard will exclude coarse particles as health hazards. Steel producers seem to favor this change. It could shift some non-attainment areas into the attainment column.

However, the emphasis on fine particles could complicate the trade-offs in bubble plans. The full impact of the new standards won't be known until EPA decides on the precise number of particles that constitute a health hazard.

As it stands, the ceiling is 260 micrograms per cubic meter. In a typical situation, about half the dust is fine—under 10 microns. That means the present standard for fine particles is somewhere around 130 micrograms. The Advisory Committee has given a range that extends above and below that level.

Steel producers don't see any big changes in the technology of emission control.

"If the standard is adopted at the low end of the range, it may mean more controls within three years," says Dr. Anderson. "The betting is it will be less stringent."

The secondary air standard is still very much up in the air. The Advisory Committee has said it should be based on visibility. The Committee has suggested a particle level but has not made a firm recommendation.

"All indications are they will set primary and secondary standards at the same level," says Dr. Anderson.

The Act doesn't specify when secondary standards should take effect. Maryland, which has one of the few complete plans, has chosen a 1985 deadline. Some states are using the same deadline for both primary and secondary standards. Many states have ignored secondary standards.

Dr. Anderson sums up the situation this way: "There are additional requirements facing us with the timetable poorly defined and requirements poorly defined."

The requirement to equip new facilities won't be too burdensome for the simple reason that steel companies aren't building many new facilities. The depressed state of the industry helps explain why the stretch-out of steel deadlines has been of only limited value.

Under 1981 legislation, steel companies can delay compliance with air standards if certain conditions are met. The main provision is that the money saved from the pollution delay must be committed for modernization by July of 1983. Companies must certify under oath that the modernization projects would not have been launched without the pollution saving. There must also be a commitment to make money available for the full cleanup job by 1985.

With their operations in the red, steel companies don't feel they can make extended capital commitments of any kind. National Steel Corp., Inland Steel and others have withdrawn their applications for stretchout. Armco never applied.

In August, U. S. Steel received preliminary approval of a stretchout of air deadlines for its major mills. The approval was a "timely and helpful move," said David M. Roderick, chairman of U. S. Steel.

The timeliness of the action isn't fully established. "We must work expeditiously to modify the consent decrees to include extended compliance dates for our plants," said Mr. Roderick. He noted that this will mean negotiations with the Justice Dept., EPA, state and local officials.

Mr. Roderick praised EPA for an effort to "balance its clean air regulatory activity with the current national concern for boosting plant modernization."

If there is not a balancing of environmental needs with economic realities, the effect could be to accelerate the contraction of the steel industry. It's no secret steel producers are taking a hard look at all plants with a view to possible shutdowns. In marginal cases, says Mr. Barker, "the environmental cost will be the final straw."

It was not the straw that led Bethlehem to announce plans for selling its operations in Seattle and Los Angeles. Dr. Anderson is quick to say that both plants are in full compliance.

Steel producers don't see any big changes in the technology of emission control. The shed seems to be coming back into the picture for coke oven pushing emissions. New ways have been devised for controlling blast furnace cast house emissions.

The big change, however, is in the philosophy being applied. "We're seeing a much more intensive effort to look at cost and see if we can do the job more efficiently," says Mr. Barker.

The job will probably never reach the point where steel producers can sit back and say there is nothing more to do. Even when all the capital projects are completed, there will still be a need to maintain and operate facilities. □

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LIVING WITH SLOW GROWTH IN AMERICA

Economic growth will slow in the U.S. over the coming decade, say some top forecasters. Already, a number of major corporations are reshaping strategies to assure their own growth.

By John D. Baxter

The backwash of the current recession—and years of economic slowdown preceding the recession—carry some hard lessons for managers in manufacturing companies.

The lessons could lead to new ways of running companies and doing business for years to come.

That prospect is underscored by the increasing number of forecasters who see slowed economic growth, and moderated inflation, for the rest of the decade of the 1980s.

Some major U.S. manufacturers, with this view of the future, are already shifting their strategies to help assure their own continued rapid growth in the slow years coming up.

At this point in time, one of the harshest lessons comes from disinflation.

For one, disinflation means that the inflation-nurtured corporate strategy of free-wheeling product price increases to achieve profit goals is going by the boards.

As one executive puts it bluntly, "Price hikes can no longer be a cover-up for company inefficiencies."

Analysts at Moody's Investors Service say the prime implication of the new disinflationary environment is that "only the efficient producers will survive." The non-survivors, say the analysts, will be those manufacturers who ignore the disinflation reality in their product definition, markets and pricing strategies.

An insight, and a warning, on the new economic environment comes also from Edward S. Hyman, chief economist for the investment firm, Cyrus J. Lawrence, Inc. "Too many companies have planned on an 8 pct inflation rate and

it's more likely to be 4 pct. Only a very few companies are going to be able to cope with that and not lose their footing."

And long-term slower growth markets, with competitors thus more hungry and meaner, are leading to new corporate strategies to stake out market beachheads. In many cases, traditional market-share strategies are yielding to refined new-reality strategies that pinpoint and hold on to profitable market 'niches.'

In addition to these management approaches, there are strategy shifts to better compete on the basis of superior product quality, better service or technological leadership. In short, emphasis on more bang-for-the-buck strategies that allow companies to post prices that are still high enough in a slow-market, disinflationary setting to assure company profitability.

That profitability can't be assured any longer by a company's regular ratcheting up of its prices as was the easy-way strategy when inflation was the name of the game.

Too, the old imperatives of cutting costs and improving efficiency are being pushed to new heights of corporate commitment and action.

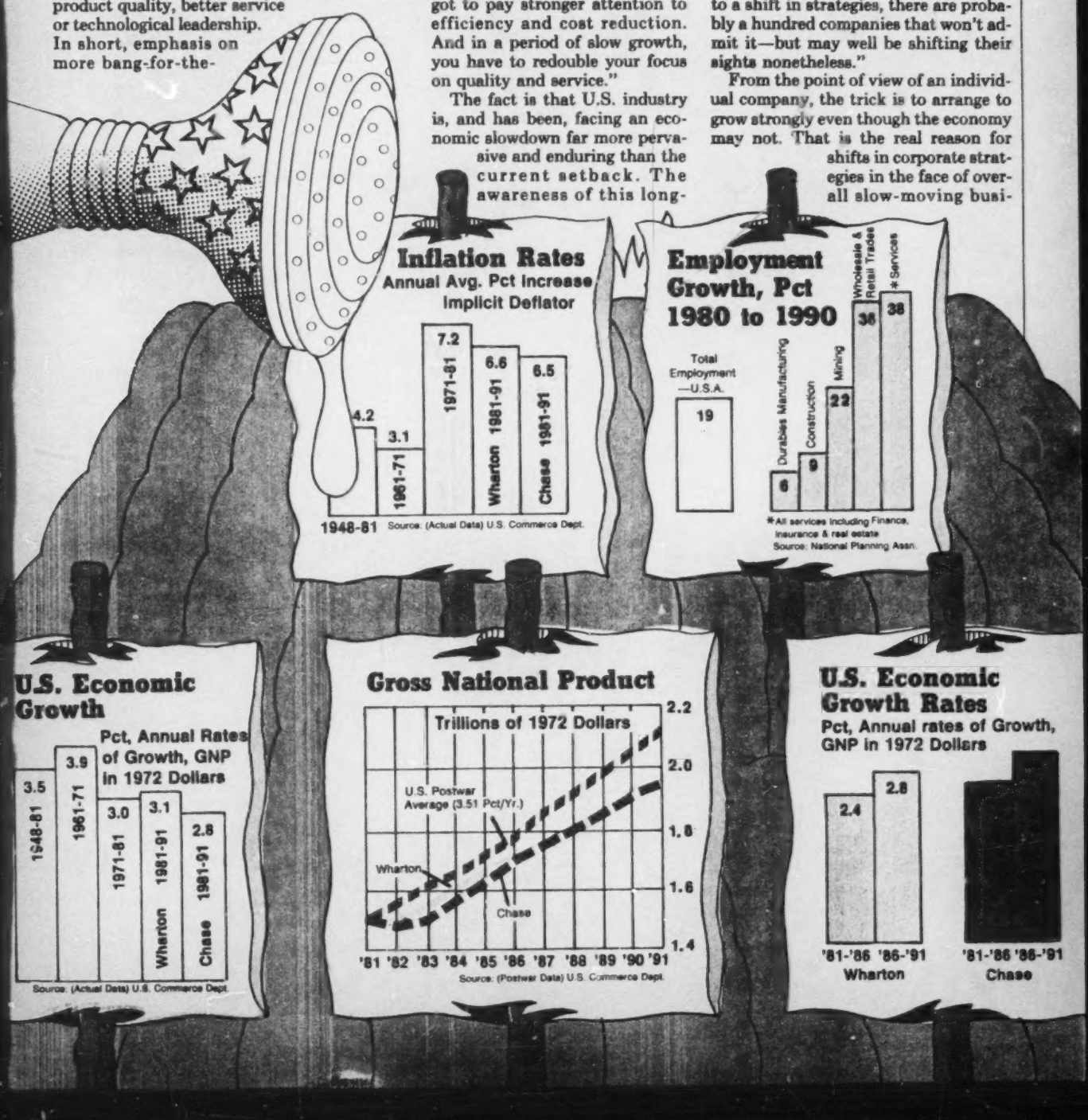
Edward Jefferson, DuPont Co. chairman, has said, "With a lower rate of expansion for existing products, you have got to pay stronger attention to efficiency and cost reduction. And in a period of slow growth, you have to redouble your focus on quality and service."

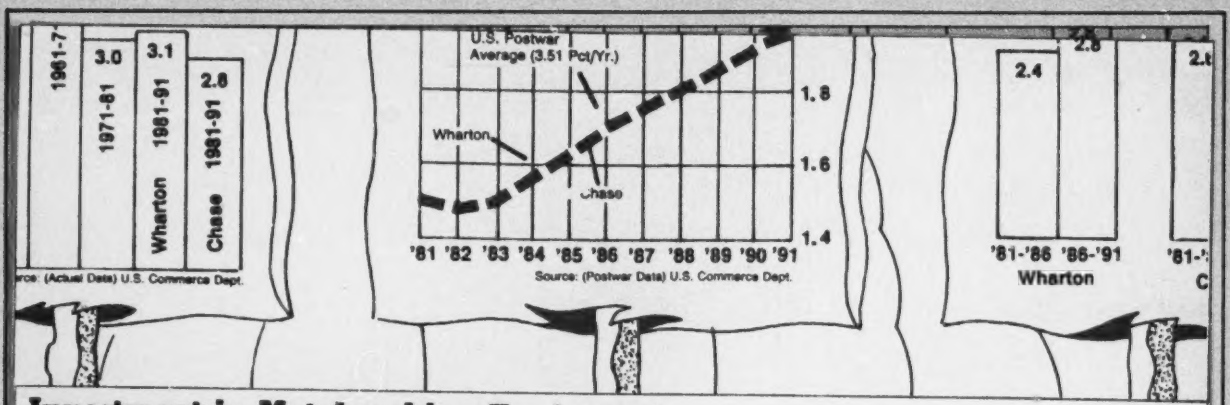
The fact is that U.S. industry is, and has been, facing an economic slowdown far more pervasive and enduring than the current setback. The awareness of this long-term-sub-par performance by the U.S. economy—with prospects for more of the same—is growing, and already starting to reshape corporate strategies. That list of companies includes some of the nation's largest and best managed ones such as General Electric Co. and Union Carbide Corp.

Some companies don't like to admit such things as coming business slowdowns. They take great pride in their current carefully honed strategies that management has hailed repeatedly in reports to stockholders.

One top corporate planning executive notes, "For every company that admits to a shift in strategies, there are probably a hundred companies that won't admit it—but may well be shifting their sights nonetheless."

From the point of view of an individual company, the trick is to arrange to grow strongly even though the economy may not. That is the real reason for shifts in corporate strategies in the face of overall slow-moving busi-





Investment in Metalworking Equipment

Selected Equipment, Billions of 1972 Dollars

	1977	1985			1990		
	Actual	Low	High I	High II	Low	High I	High II
Metalworking Machinery	$4.6	$5.3	$6.5	$6.5	$6.2	$9.0	$9.1
Construction, Mining & Oilfld. Mach.	4.6	6.1	7.4	7.4	7.9	11.4	11.5
Farm Machinery	5.6	6.9	8.2	8.3	8.3	11.8	11.8
Special Industry Machinery	3.6	4.4	5.4	5.4	4.6	6.7	6.8
General Industry	2.9	3.7	4.6	4.6	5.0	7.3	7.4
Material Handling Equipment	1.7	2.4	3.0	3.0	3.2	4.6	4.6
Fabricated Structural Products	1.6	2.0	2.4	2.4	2.6	3.8	3.8
Fabricated Metal Products (Ex: Struct.)	.7	.9	1.1	1.1	1.0	1.5	1.5
Engines, Turbines & Generators	1.3	1.9	2.3	2.3	2.1	3.0	3.0
Computers & Peripheral Equip.	8.1	10.7	13.2	13.2	17.0	24.3	24.4
Electrical Transmission Equip.	2.9	3.3	4.1	4.1	4.1	5.9	6.0
Motor Vehicles	22.4	23.3	28.5	28.6	26.1	37.9	38.1
Aircraft	1.6	2.7	3.4	3.4	3.3	4.8	4.8
Ships & Boat Building & Repair	1.2	1.5	1.8	1.8	1.9	2.8	2.8
Railroad Equipment	1.5	2.4	2.9	2.9	3.1	4.4	4.5
Totals for Listed Equipment	$64.3	$77.5	$94.8	$95.0	$96.4	$139.2	$140.1

Source: U.S. Labor Dept.

ness growth. It certainly is the reason at GE and Union Carbide. They have every intention of growing strongly in the projected weak-economy years they see ahead, and they are planning for that corporate growth. This 'growth' implies quality aspects as much, or more, than it does growth in sheer size.

Before a look-ahead is made, a quick look backward is called for to clearly frame the U.S. economic growth picture.

In the 1959-69 period, the U.S. economy grew at an average annual rate of 4.2 pct, as measured by real Gross National Product. In the 1969-79 period, it grew at a 3.2 pct rate.

And, of course, everybody knows of the even more sluggish rate of growth since 1979.

The companies hardest hit by this slowdown have been those in mature, hard-goods industries which includes just about all in metalworking. For example, inflation-adjusted new orders received by durable goods producers (87 pct in metalworking industries) this year are running 22 pct below the orders dollar volume of 1978. Even after excluding the especially sick auto industry, orders were down by about 11 pct.

The story in contracts and orders for plant and equipment is almost as bad. After allowing for inflation, this year will be the third straight one of decline. In 1982, these contracts and orders will come in below the 1979 level by about 20 pct.

But the underlying weakness in the capital goods sector, so important to metalworking, goes back much further in time.

Martin Feldstein, the new chairman of the President's Council of Economic Advisers, told members of Congress recently that U.S. investment in plant and equipment has been "pathetically low."

Mr. Feldstein testified that over the past two decades, "only 3 pct of GNP has been used to increase the real net stock of plant and equipment used by our nation's business, very much less than half the rate in other industrialized countries."

It is clear that when sub-par economic performance of the U.S. is discussed by economists, it encompasses more than the current recession. Depending on the measures involved, there has been an icy hand gripping the U.S. economy since 1974 or 1978. And, in at least one very important sector, as economist Feldstein notes, an underlying weakness has existed for years well beyond the 1973-75 recession.

And, if some leading forecasters are on target, there are more slow times to come.

There will be recovery from the current recession for sure, say the forecasters. But business expansion overall running through to 1991 will not be nearly as vigorous as anyone would like. And that 'not liking' importantly includes many whose job it is to plan growth for their own companies.

The chart (See p. 37) on real GNP, 1981-91, shows how the U.S. economy is projected to grow according to two leading forecast sources. Growth rates of 2.8 pct and 3.1 pct are forecast for the decade. This compares with a U.S. long-term rate of 3.5 pct. And, in another chart, inflation rates lower than in the 1970's are forecast.

The forecasts shown here are those

Long-Term Forecasters—Beware!

Below are reprinted two of George Forstot's favorite quotations. Mr. Forstot, associate director of corporate strategic planning for Union Carbide Corp., cheerily hands out these quotes—in huge type size—to visitors who come to hear his views on the outlook for the U.S. and world economy in the years ahead.

It is worth noting that Mr. Forstot's forecast record is an excellent one. This may be so because, as his fondness for the quotations shows, he is able to keep his head above the clouds but his feet still on the ground.

Caveat Forecaster

"Prediction of the future is—despite the pretenses of self-styled futurologists—impossible save as expression of intuition, guess and wish-generated or anxiety-inspired fantasy. No matter how inexorable any given trend may seem, the history of mankind teaches us to be respectful of the impacts of the prophet, the genius, the maniac and the random event."

Robert Nisbet, *Twilight of Authority*

"Those who look too far ahead are condemned to circle endlessly in a bottomless pit in hell, their heads turned backward on their shoulders, and their copious tears flowing down the cleft in their buttocks."

Dante, *The Divine Comedy*

developed by Wharton Econometric Forecasting Associates and by Chase Econometric Associates, Inc. They, of course, are not alone in projecting such long-term growth rates. Other sources show similar projections. And the U.S. Labor Dept.'s highly-regarded projections also show much the same picture.

Also, a number of corporate economists are telling their managements the same story. Executives at such leading companies as GE, Ogden Corp., DuPont and Union Carbide have all spoken out on slowed growth prospects. But, notably, each of the companies has vowed to continue their own solid corporate growth paths. They feel they now have, or have shifted to, the corporate strategies to help achieve that end.

GE economists are projecting U.S. real economic growth at an annual rate of 3.0 pct in the period they cover, 1983-92. And Union Carbide planners see 2.9 pct growth in the years 1981-91. These rates compare to 4.2 pct in the 1956-69 period and 3.2 pct in the 1969-79 period.

There is a leavening point about the widely forecast economic slowing that lies ahead. The early part of the decade will see the sharpest rate of slowdown as the U.S. economy slowly and painfully pulls itself up from the ashes of back-to-back recessions of 1980 and 1981-82.

The pattern of accelerating growth later is seen in the chart (see p. 37) that shows the economy growing faster in the 1986-91 period than in the 1981-86 period. Wharton EFA sees a 2.4 pct growth rate moving up to a 2.8 pct one after 1986. And Chase Econometrics sees a 2.6 pct growth rate turning into a 3.1 pct pace in the latter part of the decade.

One widely agreed-on assumption underlying prospects for slower economic growth is that the decelerating economies of other industrial nations will slow the U.S. economy. This country's economy is now seen as being in lock-step with those of most of the other industrialized nations. The economies of most of those nations have matured and slowed following their glittering post-war era of reindustrialization and rapid growth.

'Not all failures of judgment in business can be charged to living in the past.'

Union Carbide President Warren M. Anderson stresses what he calls "the emergence of global interdependence to a heretofore unimagined degree."

This 'interdependence' will serve as a drag on the U.S. economy because the projected growth rates of the other industrial nations are running, and will probably continue to run, at even lower rates than for this country.

George Forstot, associate director of strategic planning for Union Carbide, notes, "Our 10-year projections show a 2.5 to 3.0 pct real GNP growth for the industrial nations. That is down sharply from a 4.4 pct rate for the 1970s."

Walter Joelson, GE chief economist, has a favorite way of illustrating this 'global interdependence' in terms of U.S. involvement.

"I look at exports and imports and relate them to the goods portion of GNP," he says.

In adding U. S. imports and exports and comparing them with this goods sector GNP, he comes up with ratios of 13 pct in 1960, 18 pct in 1970 and a whopping 41 pct in 1980.

This interdependence has now reached the point where it can have a profound impact on the U.S. economy. Mr. Joelson notes, for example, that in 1981, from the first quarter to the fourth, the decline in exports accounted for 50 pct of the decline in the U.S. real GNP in the period.

The GE chief economist cites another widely-held assumption underlying forecasts of slower long-term U.S. growth; there will be lower growth in the labor force.

"In the 1970s," he says, "we had an enormous increase in the U.S. workforce. From 1969 to 1979, the average annual increase was 2.7 pct. That is absolutely unprecedented.

"For example," he adds, "between 1959 and 1969, we had a 1.7 pct rate of growth."

Mr. Joelson explains the the high labor force growth rate of the 1970s was due to the baby boom following World War II and the enormous increase in the number of working women joining the labor force.

He adds, "Neither of these phenomena will be with us in the 1980s. We estimate the labor force will increase between 1983 and 1992 at an average annual rate of 1.4 pct.

"So you can see that if everything else were equal, the mere fact that the labor force growth rate is cut in half, is bound to slow things down."

Perhaps the most commonly mentioned assumption underlying forecasts of slower economic growth is inflation—and the need of restrictive public economic policies to fight it. This is seen as still true despite recent almost dramatic cooling of inflation rates. It is widely felt that the real test in the fight against inflation will come as the economy shucks off the recession and business expansion resumes.

John F. Welch, GE chairman and CEO, has made it clear that he sees inflation as the center-stage villain in the economic slowdown scenario.

"The real world, as we see the decade of the '80s," he has said, "will be a time when inflation is clearly the number one enemy and most countries and most governments will fight that inflation with some form of tight money and fiscal responsibility medicine. The result—slower worldwide growth—slower

growth than in any of the past three decades will clearly be the planning base for the '80s."

It's not an idle exercise when corporations make the effort to get as clear as possible view of the future. It's an integrated part of the corporate planning process. It's the basis of near-at-hand management decisions.

Says Union Carbide's Mr. Anderson, "As managers, one of our most basic responsibilities is to anticipate the future."

He adds, "Not all failures of judgment in business can be charged to living in the past. But I think that virtually all important successes in business can be attributed to a willingness to live in the future."

Union Carbide offers a quick study in how one highly successful corporation plans to grow even as they envision a slowing overall economy in the years ahead.

Company planners, including Mr. Forstot, meet with a management committee to identify and analyze various issues and forces likely to shape the future.

"We planners," he says, "in a sense ask, 'What are you betting on?' "

From those sessions is selected a dominant theme, or force, in the given period to be projected. Around this theme are developed various scenarios relating to it.

Mr. Forstot notes that in mid-1981, company executives and planners identified 'International Tension' as the dominant issue. And, from it, they developed four base scenarios:

1. Fragile World Accommodation, 2. U.S. World Leadership—which assumes strong U.S. economic growth and this country leading the world out of the recession (not presently foreseen). 3. Major World Conflict—how would U.S. economy be impacted in case of U.S. non-involvement in a conflict, possibly between Russia and China, and 4. Ultranationalism—in such a case, countries would go to extremes to isolate themselves.

The number of base scenarios vary in each new planning process. There were six the previous time the company made projections.

"So," says Mr. Forstot, "we don't try to forecast 10 years out, per se. We analyze how a dominant issue or force—under various base scenarios—might shape the economy.

"Each year, however, is issued a projection for use as a baseline for planning. In that way, we all start from the same point. A manager can use other projections, but he must fully justify it."

As a result of Union Carbide planners seeing slower growth, the company has shifted from a long-held strategy of broad diversification.

"Seeing slower growth ahead," says Mr. Forstot, "and with some of our units in mature industries, we felt the best strategy we could take would be to focus and to stop expanding in all directions. The focus was on those things we do best."

In giving further insight into the company's strategy shift, the planner says Union Carbide is planning to continue to grow even in some relatively slow markets.

"You can still grow in a slow-growth market," he notes, "by getting a greater share of it, or in finding the right niche within that market that is showing relatively faster growth.

'In the end game, however, victory belongs to the people who manage cost.'

"It is part of our planning process to look for these niches, where we have an advantage in technology, or some other capability with which to attack."

A company doesn't have to be a huge one with a global reach to find such planning helpful, says Mr. Forstot. It's all a matter of scale, he says. A smaller company just starts with the question, 'What is the dominant issue, or force, that is likely to impact my customers and my markets?' The issue can be local or a regional one, it doesn't have to be broad in scope.

Says another top corporate planner, "In most cases, managers of smaller companies, by taking a good look ahead, would be quite surprised at what they would uncover.

"Changes that can profoundly impact on a company," he adds, "have a way of sending out signals ahead. Its just a matter of taking a careful long look and in using some of the basic planning approaches used by large corporations."

In the face of widespread forecasts of slower economic growth ahead, much is being heard of 'niches' and 'edges.' These refer to finding and holding on to profitable market niches in the face of slow overall market growth. And the 'edge' refers to developing and exploiting company competitive superiority such as through technology, quality or service.

Assuming every company, like fingerprints, is unique, Union Carbide President Warren Anderson says, "The direct goal of every company is not to increase market share and operating margins; it is to define its markets by becoming unique. From this uniqueness, market share and operating margins will follow."

The recurring stress by top managers and planners in finding and exploiting 'edges' and 'niches' as a way for companies to stay strong in a weak economy, is underscored by GE Chairman Welch.

"In this slower growth environment of the '80s, as companies . . . fight for that reduced volume," he says, "there will be no room for the mediocre supplier of products and services—the company in the middle of the pack.

"The winners in this slow-growth environment will be those who search out and participate in the real growth industries and insist on being number one or number two in every business they are in—the number one or number two leanest, low-cost, worldwide producers of quality goods and services or those who have a clear technological edge, a clear advantage in a market niche."

There seems to general agreement, also, that a slow-growth economy puts a premium on effective managers.

"In this new era," says Mr. Anderson, "managerial and technical skills will count for more than sheer size or vast capital resources, and human resources for more than natural resources."

Mr. Welch's predecessor at the helm of GE, Reginald Jones, has driven home another point on what kind of managers are needed. "If companies are to succeed in an era of slower growth," he says, "they have got to have people who are interested in something more than quarterly financial reports."

Still another top executive who sees the need for new management emphasis in a leaner economy is Ralph Ablon, chairman and CEO of Ogden Corp. He says, "We believe we are in a post-industrial society and mass-production has been replaced in importance by mass consumption.

"This means," he adds, "that our basic industrial complex has been built—although in dire need of renovation—and that the end game has replaced the growth game."

Mr. Ablon further notes that, "In a period of growth, management errors are not noticed and management efficiency is not essential.

"In the end game, however, victory belongs to the people who manage cost." □

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WHAT IT TAKES TO MAKE YOUR PLANT SAFE AND SOUND

The commitment to an injury-free plant floor begins with management's involvement with its in-house program.

By George A. Weimer

Safety begins at the top. Those companies with the best records in terms of plant safety invariably are run by managers who give safety a priority one rating.

If you don't have top management commitment to a safety program, you don't have much of a safety program.

Ford Motor Co. has had an excellent safety record for years. Says Dale Gray, corporate safety director, "One reason is a great interest on the part of top management in safety in terms of involvement as well as support.

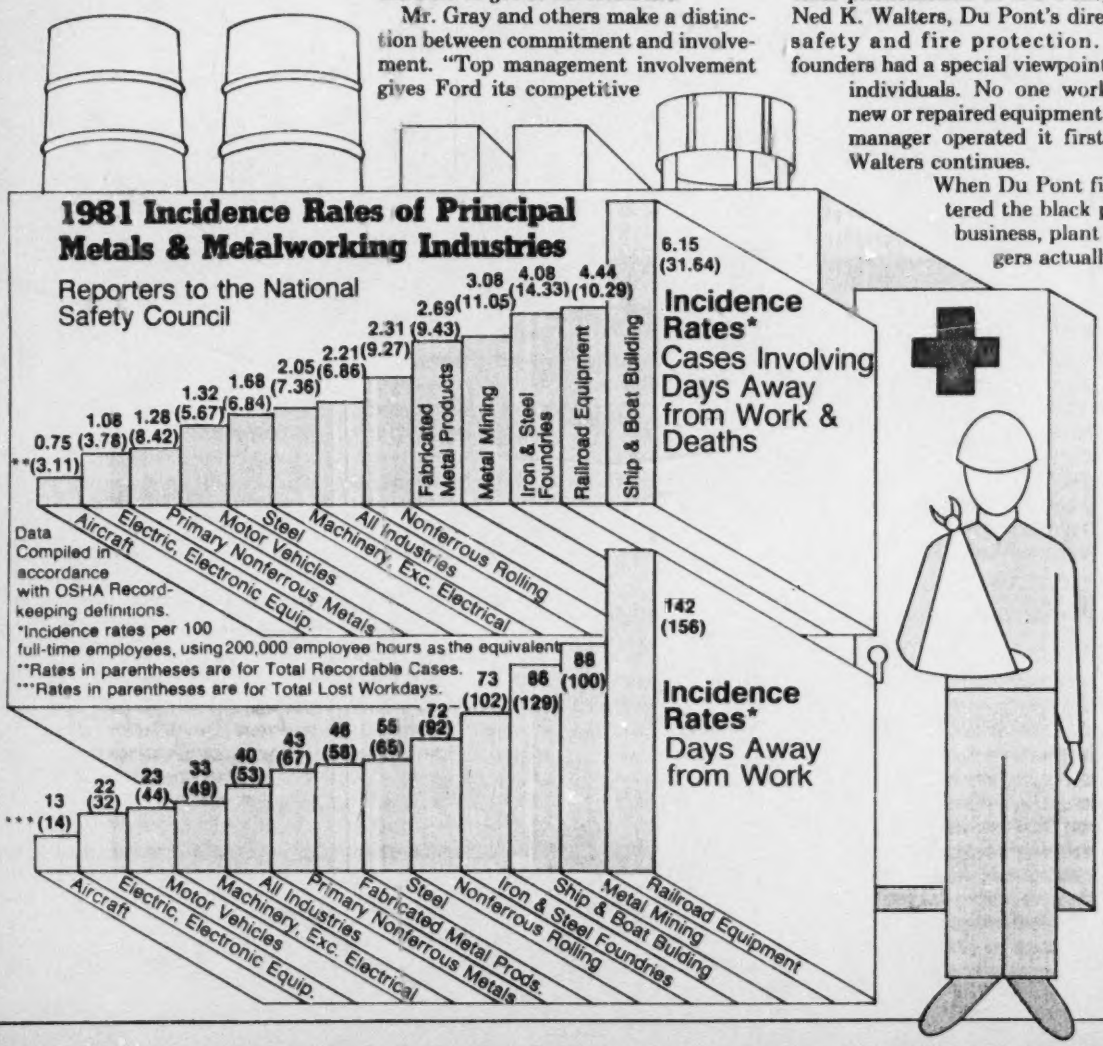
"Support," he adds, "is not nearly as difficult to get as involvement."

Mr. Gray and others make a distinction between commitment and involvement. "Top management involvement gives Ford its competitive edge in safety," Mr. Gray says. Further, he adds, "we spend money on our program."

Companies with exemplary records in safety are always companies with that same competitive edge of involvement.

Perhaps the leading company in the world of safety is Du Pont. "It's a cultural phenomenon at Du Pont," says Ned K. Walters, Du Pont's director of safety and fire protection. "The founders had a special viewpoint about individuals. No one worked on new or repaired equipment until a manager operated it first," Mr. Walters continues.

When Du Pont first entered the black powder business, plant managers actually lived



on site. "We firmly believe," adds Mr. Walters, "that a plant can operate with zero lost-time injuries."

Other companies with exemplary safety records include SPS Technologies, Republic Steel Corp., General Motors Corp., Parker Hannifin, and SCM's Glidden Coatings and Resins Div. Along with Ford and Du Pont, these leading companies in safety offer a composite model for safety programs that can approach Mr. Walters' ideal of zero lost-time accidents in industry.

How do they do it?

"It takes vigilance," says Dr. Robert G. Wiencek, General Motors Corp's general director occupational safety and health.

Besides "vigilance," it also requires auditing, monitoring and statistics. While it may seem odd to mix statistics with something as personal and potentially tragic as safety, the way these leading companies have approached the goal of zero is by statistical methods. P. F. O'Neal, Republic Steel Corp.'s corporate director of safety, industrial health and occupational medicine, notes that statistical monitoring of all injuries, no matter how minor, leads to the eventual elimination of more serious injuries.

F. Owen Kubias, manager-loss prevention, SCM Glidden Coatings & Resins says, "Many of us have a lot of Du Pont philosophy in us." All the leading companies refer to Du Pont so a detailed look at the Du Pont philosophy is appropriate.

"We ran our business for more than 150 years, working out progressively better safety systems along the way before we finally decided to sit down and analyze our experience to determine what the underlying principles were," Mr. Walters explains. "We used our experience to identify the principles. Since then, our marketing people in the Applied Technology Division have demonstrated that other companies who have adopted our principles and applied them rigorously can achieve significant improvements in their safety performance." Du Pont actually sells a safety package.

"The first principle is that all injuries and illnesses can be prevented," Mr. Walters adds.

The key word here is 'all'. "We believe that this is realistic goal and not just a theoretical objective, and our safety performance proves that the objective is achievable," he says.

Secondly, management, which includes all levels through the first-line supervisor, is responsible for preventing injuries and illnesses. Safety cannot be delegated to a staff group, a committee or a government agency.

The third principle is a corollary to the first principle: That all accidents are preventable. It holds that all operating exposures can be controlled. "In other words, where hazards cannot be eliminated, they must be managed," Mr. Walters says.

Safety is a condition of employment at Du Pont. "When you go to work for us, you must accept safety, the safety of yourself and of the people and facilities with which you work, as a consideration."

A fifth principle at Du Pont was established as a practical means for discharging that responsibility. It is: To train thoroughly all employees to perform their jobs safely.

A sixth safety principle is that "all deficiencies must be corrected immediately. Without prompt correction, deterioration will set in quickly and an increase in incidents will occur."

During this recession, . . . safety budgets have remained . . . high in terms of cost per individual employee.

Finally, "we recognize that it's good business to prevent injuries and illnesses."

Between 1976 and 1980, if Du Pont's safety record had been only as good as the chemical industry's as a whole, "our finance people tell us we'd have needed $625 million more in total sales to cover the additional expenses. If our record had been only as good as all of industry, we'd have needed an extra $1.75 billion."

More than 75 pct and, in some locations, more than 90 pct of the accidents that occur are caused by the actions of people, not faulty equipment. "That means that people must provide the solutions," Mr. Walters says.

Again, the statistical approach is the Du Pont approach. "Audit, audit, audit," says Mr. Walters. "As the seven safety principles state, feedback is a must if unsafe acts are to be avoided."

"If you're the safety director, you provide guidance to the site. The plant manager is the coach who makes certain that problems will be corrected, but the safety director must give management the advice, the game plan, if you will, it needs to accomplish the safety goals," Mr. Walters advises.

"If construction is behind time, or if a process isn't working properly, there is a human tendency to put safety aside until the problem is overcome. It is up to the safety director to keep safety goals in front of management all the time, to take a stand whenever it is needed."

Like Du Pont, Parker Hannifin's John Thompson, vice president, corporate industrial engineering, insists on regular safety meetings "top to bottom. It's a pretty high priority in our business. We've had no fatalities in 11 years. It's just good business not to have accidents."

"Keep safety in front of everybody," adds SCM's Mr. Kubias. "You need commitment and you need training. For new employees, don't wait. If you wait on safety training it doesn't seem important. Have regular safety meetings, certainly not less than monthly."

But, "a lot of companies think 'if you make an inspection, you've got a safety program.' The people part is more important; people thinking safety," Mr. Kubias says.

"The unsafe act," he warns, "is not always done by the injured.

"Safety," he adds, "can be managed, just like any other business responsibility."

Adds Republic's Mr. O'Neal, "When we design a new facility, safety is planned into it."

And, during this recession, all of these leading companies note that safety budgets have remained proportionately high in terms of costs per individual employee.

Republic's program, like Du Pont's, involves a great deal of management, union, and employee time. "We have two types of meetings. Once a week, every employee is contacted on safety personally. Our supervisors are required to talk to every employee on that regular basis. And, we have group safety managers meetings."

Just how high a priority safety is at Republic is seen in the one and only time an employee can refuse to do a job. If he says it's unsafe.

"A healthy, alert, intelligent, and well-motivated employee is the heart and soul of any good safety program and SPS's major emphasis in the prevention of accidents centers around people," says Rockwell M. Groves, SPS Technologies' vice president industrial relations.

"A good attitude toward safety is the cornerstone of SPS's safety record. Employees are able to contribute their ideas on safety through participation in a joint employee/management Safety Committee team.

"The employee committee members have been trained to regularly look for accident potentials, and to make recommendations for corrective action. Management also holds small group "Employee Communication Meetings"

which give employees the opportunity to discuss any aspect of their job—safety, quality or productivity, for example—with the plant manager.

Attempts are also made to solicit employee input into the design of machine guarding or sound covers. A heavy emphasis is placed on a neat, clean hazard free work area through monthly "Good Housekeeping" campaigns and awards.

"While our employees are the key to safety at SPS there is also behind the scenes work being completed on accident analysis, air and noise sampling, and safety training," Mr. Groves says.

"To provide a safe and healthy workplace for employees and to protect the value of our property and assets, it is necessary to have a strong safety program coupled with motivated employees who are concerned about their own well-being," Mr. Groves adds.

This means recognizing "potential threats to employees and property and taking steps to have employees help minimize them, keeping up with technological advances, and staying in compliance with hundreds of constantly changing state and Federal laws and regulations."

Also, all these leading companies suggest avoiding the gimmicks or at least minimizing such tools as contests, signs, slogans and so on. Safety is almost an unbelievably serious subject at the leading companies. "We've used all kinds of signs, reminders and so on, but they don't make or break a safety program," says Mr. O'Neal. He does suggest frequent changes in slogans if they are used. "We avoid contests and gimmicks in general," adds Parker Hannifin's Mr. Thompson.

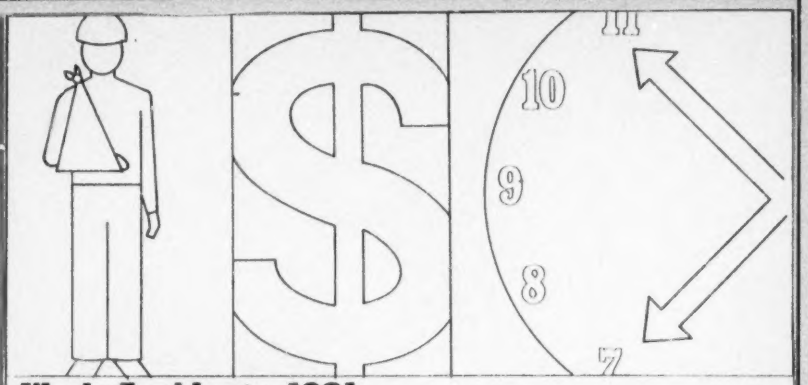
The only "contest" at Parker Hannifin is one in which an award comes directly from Patrick Parker, chairman, annually.

More important than signs in the plant, all the experts agree, is continuing education and constant monitoring. "Signs are reminders only," says Republic's Mr. O'Neal.

How do you measure a plant or a company's safety record. In two ways, says Mr. O'Neal. The incident rate and time lost." It's in the latter measure that the costs lie. But, it's in the former that much of the solution to the whole problem lies, leading safety experts agree. And, it's via statistical methods that the zero lost time goal is approached.

"Our objective is to reduce the frequency," says Mr. O'Neal. "If we reduce the frequency, we automatically reduce severity. We can show that statistically," he says.

All of these leaders in the safety area use computer techniques to manage



Work Accidents, 1981

Industry Group	Workers (000)	Deaths 1981	Deaths Change from 1980	Death Rates* 1981	Death Rates* 1971	Death Rates* Pct Change	Disabling Injuries 1981
All Industries	99,800	12,300**	−700	12	17	−29	2,100,000
Agriculture	3,400	1,900	−100	54	62	−13	200,000
Mining, quarrying	1,100	600	+100	55	83	−34	50,000
Construction	5,500	2,200	−300	40	58	−31	210,000
Manufacturing	20,200	1,400	−200	7	9	−22	400,000
Transportation and public utilities	5,400	1,700	+200	31	36	−14	200,000
Trade	22,500	1,200	−200	5	8	−38	360,000
Service	25,900	1,700	−100	7	12	−42	380,000
Government	15,800	1,600	−100	10	13	−23	300,000

Source: National Safety Council estimates. Numbers of workers are based on Bureau of Labor Statistics data and include persons aged 14 and over. * Deaths per 100,000 workers in each group.
** About 4,400 of the deaths and 200,000 of the injuries involved motor vehicles.

Time lost because of work injuries

	Days Lost
Total Time Lost in 1982	80,000,000
Due to Accidents in 1981	40,000,000

Includes primarily the actual time lost during the year from disabling injuries, except that it does not include time lost on the day of the injury or time required for further medical treatment or check-up following the injured person's return to work.

Fatalities are included at an average loss of 150 days per case, and permanent impairments are included at actual days lost plus an allowance for lost efficiency resulting from the impairment.

Not included is the time lost by persons with nondisabling injuries or other persons directly or indirectly involved in the accidents.

Due to Accidents in Prior Years	40,000,000

This is an indicator of the amount of productive time lost in 1981 due to permanently disabling injuries that occurred in prior years.

Time Loss in Future Years from 1981 Accidents	110,000,000

Includes time lost in future years due to on-the-job deaths and permanently disabling injuries that occurred in 1981.

Work accident costs

Compensation paid to all workers in the nation who are under workers' compensation laws was approximatey $13,359,000,000 in 1980 (latest figures reported by the Social Security Administration). Of this amount, $3,860,000,000 was for medical and hospital costs and $9,499,000,000 for wage compensation. These figures are not comparable to Council cost estimates due to differences in coverage of workers and types of cases.

Total Cost in 1981	$32,500,000,000
Visible Costs	$15,100,000,000

Includes wage losses of $5,100,000,000 insurance administrative costs amounting to about $6,600,000,000 and medical costs of $3,400,000,000.

Other Costs	$15,100,000,000

Includes the money value of time lost by workers other than those with disabling injuries, who are directly or indirectly involved in accidents. Also included would be the time required to investigate accidents, write up accident reports, etc.

Fire Losses	$2,300,000,000
Cost Per Worker	$330

This figure indicates the value of goods or services each worker must produce to offset the cost of work injuries. It is *not* the average cost of a work injury.

safety. "We enter into the computer all personal safety contacts. We're particularly interested in who's being missed. Every minor injury is recorded and investigated. If we can eliminate the minor injuries, we've also eliminated the major injuries and fatalities," says Mr. O'Neal.

Every morning at Republic, plant managers get reports from department supervisors. "The first thing discussed is plant safety throughout the corporation."

"The very old philosophy in industry," adds SCM's Mr. Kubias, "was accidents were part of getting something made. But for some time now we have seen it as a matter of management just like quality, production and profit."

All these experts agree that there are clear moral reasons for everyone to "think safety." But two other major corporate motivations for safety consciusness are legal and economic.

The economics of safety are clear in terms of workmen's compensation costs. Some interesting statistics on that and other cost-effective aspects of safety come up in a recent study from Lewis R. Kertesz in the Nebraska Safety Survey Research Project of the University of Nebraska, Lincoln, Neb.

Firms that have a separate budget for safety had 43 pct fewer accidents than those firms that do not have a separate safety budget, the study said.

Firms that used outsiding training organizations in safety training experienced 57.6 pct fewer accidents than those firms that do not use any outside help.

Those that conduct specific safety training for supervisors experienced 61.5 pct fewer accidents than those firms that do not conduct such training.

Companies which have an established system of safety inspections had 39.9 pct fewer accidents than those firms that do not conduct safety inspections.

And, those that have a written safety program had 106 pct fewer accidents than those that did not have their program in writing. If the firm wrote its own program, it experienced an accident rate 129 pct better than those that had no written program.

The most startling statistic of this study bears out what all leading company experts say over and over again.

Companies that had top management actively involved in promoting safety awareness had 469.8 pct fewer accidents than those firms that do not experience an active role in safety awareness.

The study also implied that the larger the company, the better its safety record. Part of that is a matter of available resources. Part also is a "it can't happen to me" syndrome in some smaller companies, says Mr. Kubias.

It is an irony that the Occupational Safety and Health Administration (OSHA) spent so much time and money on larger companies while much of the problem was and is with smaller companies. However, all the leading safety companies agree that OSHA was needed and has become more of a help over the years since 1971. They particularly applaud current OSHA Administrator Thorne G. Auchter's cooperative approach rather than the "police type" approaches of some of his predecessors.

Further trends in safety will include assisting workers in terms of safety off the job as well.

"When I came to OSHA, I established one major goal, reducing occupational injury and illness rates. We have sought to do that through a cooperative approach to workplace safety and health that uses a balanced mix of programs focused on the central goal of reducing occupational injury and disease. In our balanced mix, we have begun work on a number of safety and health standards, bolstered and clarified enforcement policies and improved our relationship with state programs," Mr. Auchter says.

"Most exciting and most promising, however, are our compliance assistance initiatives. These are efforts to intensify health and safety protection through voluntary workplace initiatives without an additional burden on OSHA resources.

"Wherever we can stimulate and encourage strong safety and health programs at the workplace, we should do so. Such programs capitalize on the expertise of employees and employers who are available in the workplace all day, every day to handle problems and to provide continuous monitoring of the worksite for potential hazards. In many cases, corrections can be made immediately.

"Thus, an effective program can make a far greater difference in the injury and illness record at a particular worksite than can a one-shot OSHA inspection," Mr. Auchter adds.

While some experimental programs are in effect, OSHA will continue to respond to worker complaints, and reports of imminent danger and catastrophes, but will not schedule programmed inspections.

As for the small company program, one "experimental approach we're testing would encourage employers, particularly small business in high hazard industries, to seek assistance through an on-site consultation program. Once the changes recommended by the consultant are completed, the employer will not be subject to a programmed inspection for one year," says Mr. Auchter.

And, safety management is not a static kind of discipline. It deals with technological changes just like any other kind of management.

One fast growing area of plant safety concern is toxic substances, notes GM's Dr. Wiencek. "We have a chemical substances listing system with a data base of 150,000 trade names used by our various plants in the U.S. and Canada. Before a material us used, it is checked through the computer.

"We have to know what's happening constantly in our plants," he adds.

GM and the UAW also agreed this year to establish an occupational health and safety board. The board is composed of six outside directors from the academic world and serves to advise GM on its health and safety program. "This is unique in industry," says Dr. Wiencek.

Further trends in safety will include assisting workers in terms of safety off the job as well, adds Republic's Mr. O'Neal.

And, the whole issue of robotics will need new concepts of safety, says Dr. Wiencek. "Robots must have safety engineered into the robot's envelope of activity."

Further advice on safety comes in terms of qualified people in safety engineering and industrial hygiene. Since the advent of OSHA, "more and more colleges offer training in these areas now," notes SCM's Mr. Kubias. "And safety equipment as well is becoming more sophisticated."

Finally, whether you are a leader in the safety area now or want to be, there is the issue of cost. Why is Ford a leader? "We spend money on our program," answers Mr. Gray.

And why is Du Pont so advanced? A key "raw material," says assistant manager, safety and fire protection, David J. Willette "is money. We've learned at Du Pont that money sunk into the 'safety process' is money well spent. Safety pays because it makes the entire operation of the company more effective." □

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EFFECTIVE OCTOBER 4, 1982

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	163	157	123	235
Buffalo	29	31	27	58
Pittsburgh	123	130	125	376
Youngstown	60	61	62	124
Cleveland	96	100	106	158
Detroit	107	110	117	156
Chicago	361	3[illegible]	358	539
Cincinnati	54	[illegible]	76	93
St. Louis	57	51	38	83
Southern	72	74	74	245
Western	58	62	67	138
U.S. Production	1,180	1,209	1,173	2,205

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective October 4, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	1,180	1,209	58,507	95,323
Capability Utilization Rate	39.9	41.0	50.4	82.0
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron* * (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$203.00
Scrap No. 1 hvy.* * * (Gross ton = 2240 lbs.)	$ 53.50	$ 55.50	$ 56.50	$ 91.17
No. 2 bundles	$ 39.50	$ 40.50	$ 41.83	$ 62.50
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh ..	$ 55.50	$ 57.50	$ 57.50	$101.50
No. 1 steel, Philadelphia	58.50	59.50	59.50	78.50
No. 1 steel, Chicago.....	46.50	49.50	52.50	93.50
No. 1 bundles, Detroit...	47.50	47.50	51.50	93.50
Low Phos., Youngstown	58.50	63.50	63.50	103.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	94.50
No. 1 mach'y cast., Phila	98.50	98.50	100.50	117.50
No. 1 mach'y cast., Chi.	103.50	103.50	105.50	127.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective October 4, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	65.00-67.00	64.00-67.00	10/1/82
Lead	24.50-29.00	25.00-29.00	9/24/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	41.00-42.00	42.00	10/4/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas .$2.00
Beryllium-aluminum 5% Be, per lb. contained Be.....$201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200.....$166.00
Bismuth, ton lots .....$1.35-$1.45
Cadmium, under one ton .....$1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8%.....$3.75
Cobalt, 99%, 250 kg.....$12.50
Gold per troy oz. $387.50
Indium, 99.9%, troy oz. $4.00
Iridium, dollars per troy oz.....$600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$352-$375
Molybdenum, lb. tech. moly oxides, 20 lb. MO can.....$6.85-$8.50
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz.....$475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz.....$7.96
Vanadium $4.94
Zirconium sponge.....$12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Sept. 27—559.68
Sept. 28—Holiday
Sept. 29—559.48
Sept. 30—557.42
Oct. 1—557.19

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	65½	56¼
Yellow brass	57⅞	52¾
Red brass	61¼	54¾
Comm. bronze	62¼	55¼
Mang. bronze	57¾	56
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	46
Light copper	37

Ingot Makers Scrap

(Cents per lb. carload lots, del. refinery)

No. 1 copper wire	49
No. 2 copper wire	42
Light copper	33
No. 1 composition	50
No. 1 comp. turnings	48
Hvy. yellow brass solids	31
Hvy. yellow brass turnings	25
Radiators	40

Aluminum

New mixed clips	25	—26
Old sheet	24	—25
Old cast	24	—25
Clean dry borings	24	—25

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	23	—24
Mixed L.C. clips	21	—22
Old sheets and cast	15	—16
Borings and turnings	12	—13
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	44	—45
No. 2 copper wire	37	—38
Light copper	33	—34
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	24	—25
Brass Pipe	28	—29
New soft brass clippings	36	—37

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	20	—21

Nickel

Nickel solids	115	—120
Nickel rod ends	115	—120
Nickel sheets, clips	115	—120
Nickel turnings	55	— 60

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

EFFECTIVE OCTOBER 4, 1982

MATERIALS NEWSFRONT

(Effective October 4, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	48.00 to	49.00
No. 1 dealer bundles	66.00 to	67.00
No. 1 factory bundles (auto)	60.00 to	61.00
No. 2 bundles	40.00 to	41.00
No. 1 busheling	69.00 to	70.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	72.00 to	73.00
Heavy turnings	48.00 to	49.00
No. 1 RR hvy. melting	69.00 to	70.00
Rails 2 ft. and under	86.00 to	87.00
Scrap rails, random lgth.	82.00 to	83.00
RR specialties	73.00 to	74.00
No. 1 machinery cast	71.00 to	72.00
Cupola cast	64.00 to	65.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	540.00 to	550.00
18-8 turnings	440.00 to	450.00

Chicago

No. 1 hvy. melting	$ 46.00 to	$ 47.00
No. 2 hvy. melting	42.00 to	43.00
No. 1 dealer bundles	58.00 to	59.00
No. 1 factory bundles (auto)	60.00 to	61.00
No. 2 dealer bundles	38.00 to	39.00
Unburned bundles	34.00 to	35.00
No. 1 busheling	57.00 to	58.00
Shredder scrap	57.00 to	58.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	33.00 to	34.00
Low phos. forge crop	79.00 to	80.00
Low phos. punchings plate ¼ in. and heavier	83.00 to	84.00
Low phos. 2 ft. and under	78.00 to	79.00
No. 1 RR hvy. melting	50.00 to	51.00
Scrap rails, random lgth.	54.00 to	55.00
Reroller rails	85.00 to	86.00
Rails, 2 ft. and under	79.00 to	80.00
RR couplers and knuckles	72.00 to	73.00
RR car axles	102.00 to	103.00
No. 1 machinery cast	103.00 to	104.00
Cupola cast	89.00 to	90.00
Stove plate	76.00 to	77.00
Steel car wheels	63.00 to	64.00
Stainless		
18-8 bundles and solids	505.00 to	515.00
18-8 turnings	400.00 to	410.00
430 bundles and solids	120.00 to	130.00
430 turnings	75.00 to	80.00

Philadelphia

No. 1 hvy. melting	$ 57.00 to	$ 60.00
No. 2 hvy. melting	50.00 to	53.00
No. 1 dealer bundles	68.00 to	71.00
No. 2 dealer bundles	38.00 to	41.00
No. 1 busheling	68.00 to	71.00
Shredder scrap	71.00 to	74.00
Machine shop turn.	18.00 to	21.00
Mixed bor. and turn.	18.00 to	21.00
Shoveling turnings	27.00 to	30.00
Clean cast chemical borings	40.00 to	43.00
Low phos. 5 ft. and under	62.00 to	65.00
Low phos. 2 ft. punchings	89.00 to	92.00
Electric furnace bundles	75.00 to	78.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	89.00 to	92.00
Cupola cast	53.00 to	56.00
Heavy breakable cast	55.00 to	58.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 40.00 to	$ 41.00
No. 2 hvy. melting	38.00 to	39.00
No. 1 dealer bundles	47.00 to	48.00
No. 2 bundles	22.00 to	23.00
No. 1 busheling	46.00 to	47.00
Drop forge flashings	26.00 to	27.00
Machine shop turn.	21.00 to	22.00
Mixed borings and turn.	13.00 to	14.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	17.00 to	18.00
Heavy breakable cast	29.00 to	30.00
Mixed cupola cast	45.00 to	46.00
Automobile cast	63.00 to	64.00
Stainless		
18-8 bundles and solids	415.00 to	425.00
18-8 turnings	305.00 to	315.00
430 bundles and solids	85.00 to	95.00

Youngstown

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	35.00 to	36.00
No. 1 dealer bundles	54.00 to	55.00
No. 2 dealer bundles	33.00 to	34.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	15.00 to	16.00
Low phos. plate	58.00 to	59.00
Electric furnace bundles	58.00 to	59.00
Galvanized bundles	49.00 to	50.00

Cleveland

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	30.00 to	31.00
No. 1 dealer bundles	56.00 to	57.00
No. 1 factory bundles	56.00 to	57.00
No. 2 bundles	29.00 to	30.00
No. 1 busheling	59.00 to	60.00
Machine shop turn.	3.00 to	4.00
Mixed bor. and turn.	3.00 to	4.00
Shoveling turnings	6.00 to	7.00
Cast iron borings	6.00 to	7.00
Cut structural & plates, 2 ft. and under	80.00 to	81.00
Low phos. punchings plate	80.00 to	81.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	62.00 to	63.00
No. 1 RR hvy melting	73.00 to	74.00
Rails, 2 ft. and under	89.00 to	90.00
Rails, 18 in. and under	90.00 to	91.00
Steel axle turnings	76.00 to	77.00
Railroad cast	94.00 to	95.00
No. 1 machinery cast	99.00 to	100.00
Cupola cast	94.00 to	95.00
Stove plate	69.00 to	70.00
Stainless		
18-8 bundles	400.00 to	410.00
18-8 turnings	305.00 to	315.00
430 bundles	90.00 to	100.00

Buffalo

No. 1 hvy. melting	$ 29.00 to	$ 30.00
No. 2 hvy. melting	19.00 to	20.00
No. 1 busheling	36.00 to	37.00
No. 1 dealer bundles	34.00 to	35.00
No. 2 bundles	16.00 to	17.00
Machine shop turn.	1.00 to	2.00
Mixed bor. and turn.	10.00 to	11.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	10.00 to	11.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	46.00 to	47.00
Scrap rails, random lgth.	26.00 to	27.00
No. 1 machinery cast	69.00 to	70.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	42.00 to	43.00
Foundry steel, 2 ft.	42.00 to	43.00
No. 1 dealer bundles	50.00 to	51.00
No. 2 bundles	39.00 to	40.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	50.00 to	51.00
Rails, random length	52.00 to	53.00
Rails, 18 in. and under	67.00 to	68.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 56.00 to	$ 57.00
No. 2 heavy melting	53.00 to	54.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	43.00 to	44.00
No. 1 busheling	56.00 to	57.00
Shredder scrap	75.00 to	76.00
Machine shop. turn.	20.00 to	21.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	52.00 to	53.00
Elec. furnace, 3 ft. & under	54.00 to	55.00
Structural and plate, 2 ft.	75.00 to	76.00
Structural and plate, 4 ft.	67.00 to	68.00
No. 1 RR hvy. melting	54.00 to	55.00
Scrap rails, random lgth.	61.00 to	62.00
Rails, 18 in. and under	74.00 to	75.00
Angles and splice bars	65.00 to	66.00
No. 1 cupola cast	76.00 to	77.00
Unstripped motor blocks	55.00 to	56.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 32.00 to	$ 33.00
No. 2 hvy. melting	28.00 to	29.00
No. 1 dealer bundles	39.00 to	40.00
No. 2 bundles	28.00 to	29.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	7.00 to	8.00
Cast iron borings	8.00 to	9.00
Low phos. 18 in. and under	58.00 to	59.00
Rails, random length	47.00 to	48.00
Rails, 2 ft. and under	71.00 to	72.00
No. 1 cupola cast	52.00 to	53.00
Heavy breakable cast	22.00 to	23.00
Drop broken cast	68.00 to	69.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 30.00 to	$ 32.00
No. 2 hvy. melting	26.00 to	28.00
No. 2 dealer bundles	25.00 to	26.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	9.00 to	10.00
Shoveling turnings	14.00 to	16.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	94.00 to	95.00
Mixed yard cast	41.00 to	42.00
Heavy breakable cast	17.00 to	18.00
Stainless		
18-8 prepared solids	460.00 to	480.00
18-8 turnings	375.00 to	400.00
430 prepared solids	90.00 to	100.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 33.00 to	$ 35.00
No. 2 hvy. melting	23.00 to	25.00
No. 1 dealer bundles	35.00 to	37.00
No. 2 bundles	20.00 to	22.00
No. 1 busheling	35.00 to	37.00
Shredder scrap	45.00 to	47.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	3.00 to	5.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	33.00 to	35.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 dealer bundles	13.00 to	15.00
Machine shop turn.	5.00 to	7.00
Cast iron borings	5.00 to	7.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	29.00 to	31.00
No. 1 dealer bundles	27.00 to	29.00
No. 2 dealer bundles	10.00 to	12.00
Machine shop turn.	5.00 to	7.00
Shoveling turnings	9.00 to	11.00
Cast iron borings	5.00 to	7.00
Elec. furnace, 1 ft. and under (foundry)	87.00 to	89.00
No. 1 cupola cast	89.00 to	91.00

Seattle

No. 1 hvy. melting	$ 56.00 to	$ 58.00
No. 2 hvy. melting	45.00 to	47.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	91.00 to	93.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 53.00
No. 2 heavy melting cut 2 ft. and under	50.00
No. 1 dealer bundles	60.00
No. 2 bundles	18.00
Mixed steel scrap	32.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	28.00
Short steel turn.	31.00
Mixed bor. and turn.	20.00
Cast scrap	45.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	43.00 to	44.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	8.00 to	9.00
Crushed turnings	22.00 to	24.00
Shredder scrap	55.00 to	56.00
Cut structural plate 2 ft. and under	77.00 to	78.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	66.00

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MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	159	163	159	251
Buffalo	29	29	28	59
Pittsburgh	134	123	140	358
Youngstown	72	60	59	128
Cleveland	99	96	106	169
Detroit	95	107	107	147
Chicago	341	361	338	524
Cincinnati	68	54	74	92
St. Louis	54	57	52	88
Southern	73	72	74	245
Western	59	58	58	143
U.S. Production	1,183	1,180	1,195	2,204

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective October 11, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	1,183	1,180	59,690	97,423
Capability Utilization Rate	40.0	39.9	50.2	81.7

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$203.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 53.50	$ 53.50	$ 56.17	$ 88.17
No. 2 bundles	$ 39.50	$ 39.50	$ 40.50	$ 59.17
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh ..	$ 55.50	$ 55.50	$ 57.50	$101.50
No. 1 steel, Philadelphia	58.50	58.50	59.50	78.50
No. 1 steel, Chicago.....	46.50	46.50	51.50	84.50
No. 1 bundles, Detroit...	47.50	47.50	51.50	83.50
Low Phos., Youngstown	58.50	58.50	63.50	95.50
No. 1 mach'y cast., Pgh	66.50	71.50	71.50	94.50
No. 1 mach'y cast., Phila	98.50	98.50	100.50	117.50
No. 1 mach'y cast., Chi.	103.50	103.50	105.50	124.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective October 11, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	66.00-67.00	64.50-67.00	10/8/82
Lead	23.00-29.00	24.00-29.00	10/5/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00-42.00	41.00-42.00	10/5/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.35-$1.45
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $433.00
Indium, 99.9%, troy oz. ..... $2.85-$4.00
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. .. $370-$380
Molybdenum, lb. tech. moly oxides, 20 lb. MO can ..... $6.85-$8.50
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $8.975
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Oct. 4—556.26 Oct. 7—556.26
Oct. 5—556.26 Oct. 8—556.26
Oct. 6—556.26

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	64⅛	53¼
Yellow brass	55¾	50⅝
Red brass	58¾	52¼
Comm. bronze	59½	52½
Mang. bronze	56	54¼
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	46
Light copper	37

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	49
No. 2 copper wire	42
Light copper	33
No. 1 composition	50
No. 1 comp. turnings	48
Hvy. yellow brass solids	31
Hvy. yellow brass turnings	25
Radiators	40

Aluminum

New mixed clips	25	—26
Old sheet	24	—25
Old cast	24	—25
Clean dry borings	24	—25

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	23	—24
Mixed L.C. clips	21	—22
Old sheets and cast	15	—16
Borings and turnings	12	—13
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	44	—45
No. 2 copper wire	37	—38
Light copper	32	—33
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	24	—25
Brass Pipe	28	—29
New soft brass clippings	36	—37

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	20	—21

Nickel

Nickel solids	115	—120
Nickel rod ends	115	—120
Nickel sheets, clips	115	—120
Nickel turnings	55	— 60

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

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MATERIALS NEWSFRONT

(Effective October 11, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 55.00 to $ 56.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 dealer bundles	66.00 to 67.00
No. 1 factory bundles (auto)	60.00 to 61.00
No. 2 bundles	40.00 to 41.00
No. 1 busheling	69.00 to 70.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	18.00 to 19.00
Low phos. punchings plate	72.00 to 73.00
Heavy turnings	48.00 to 49.00
No. 1 RR hvy. melting	69.00 to 70.00
Rails 2 ft. and under	86.00 to 87.00
Scrap rails, random lgth.	82.00 to 83.00
RR specialties	73.00 to 74.00
No. 1 machinery cast	66.00 to 67.00
Cupola cast	59.00 to 60.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	520.00 to 530.00
18-8 turnings	420.00 to 430.00

Chicago

No. 1 hvy. melting	$ 46.00 to $ 47.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	58.00 to 59.00
No. 1 factory bundles (auto)	60.00 to 61.00
No. 2 dealer bundles	38.00 to 39.00
Unburned bundles	42.00 to 43.00
No. 1 busheling	57.00 to 58.00
Shredder scrap	57.00 to 58.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	33.00 to 34.00
Low phos. forge crop	79.00 to 80.00
Low phos. punchings plate ¼ in. and heavier	83.00 to 84.00
Low phos. 2 ft. and under	78.00 to 79.00
No. 1 RR hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	54.00 to 55.00
Reroller rails	85.00 to 86.00
Rails, 2 ft. and under	79.00 to 80.00
RR couplers and knuckles	72.00 to 73.00
RR car axles	102.00 to 103.00
No. 1 machinery cast	103.00 to 104.00
Cupola cast	89.00 to 90.00
Stove plate	76.00 to 77.00
Steel car wheels	63.00 to 64.00
Stainless	
18-8 bundles and solids	470.00 to 480.00
18-8 turnings	370.00 to 380.00
430 bundles and solids	110.00 to 120.00
430 turnings	70.00 to 75.00

Philadelphia

No. 1 hvy. melting	$ 57.00 to $ 60.00
No. 2 hvy. melting	50.00 to 53.00
No. 1 dealer bundles	66.00 to 71.00
No. 2 dealer bundles	38.00 to 41.00
No. 1 busheling	68.00 to 71.00
Shredder scrap	71.00 to 74.00
Machine shop turn.	18.00 to 21.00
Mixed bor. and turn.	18.00 to 21.00
Shoveling turnings	30.00 to 33.00
Clean cast chemical borings	40.00 to 43.00
Low phos. 5 ft. and under	62.00 to 65.00
Low phos. 2 ft. punchings	89.00 to 92.00
Electric furnace bundles	75.00 to 78.00
RR specialties	74.00 to 77.00
Rails, 2 ft. and under	89.00 to 92.00
Cupola cast	53.00 to 56.00
Heavy breakable cast	55.00 to 58.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 40.00 to $ 41.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	46.00 to 47.00
Drop forge flashings	26.00 to 27.00
Machine shop turn.	21.00 to 22.00
Mixed borings and turn.	13.00 to 14.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	17.00 to 18.00
Heavy breakable cast	29.00 to 30.00
Mixed cupola cast	45.00 to 46.00
Automobile cast	63.00 to 64.00
Stainless	
18-8 bundles and solids	415.00 to 425.00
18-8 turnings	305.00 to 315.00
430 bundles and solids	85.00 to 95.00

Youngstown

No. 1 hvy. melting	$ 52.00 to $ 53.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	54.00 to 55.00
No. 2 dealer bundles	33.00 to 34.00
Machine shop turn.	4.00 to 5.00
Shoveling turnings	15.00 to 16.00
Low phos. plate	58.00 to 59.00
Electric furnace bundles	58.00 to 59.00
Galvanized bundles	49.00 to 50.00

Cleveland

No. 1 hvy. melting	$ 47.00 to $ 48.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	56.00 to 57.00
No. 1 factory bundles	56.00 to 57.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	58.00 to 59.00
Machine shop turn.	3.00 to 4.00
Mixed bor. and turn.	3.00 to 4.00
Shoveling turnings	6.00 to 7.00
Cast iron borings	6.00 to 7.00
Cut structural & plates, 2 ft. and under	78.00 to 79.00
Low phos. punchings plate	78.00 to 79.00
Drop forge flashings	33.00 to 34.00
Foundry steel, 2 ft. & under	62.00 to 63.00
No. 1 RR hvy melting	73.00 to 74.00
Rails, 2 ft. and under	87.00 to 88.00
Rails, 18 in. and under	88.00 to 89.00
Steel axle turnings	76.00 to 77.00
Railroad cast	94.00 to 95.00
No. 1 machinery cast	99.00 to 100.00
Cupola cast	94.00 to 95.00
Stove plate	69.00 to 70.00
Stainless	
18-8 bundles	400.00 to 410.00
18-8 turnings	305.00 to 315.00
430 bundles	90.00 to 100.00

Buffalo

No. 1 hvy. melting	$ 27.00 to $ 28.00
No. 2 hvy. melting	17.00 to 18.00
No. 1 busheling	34.00 to 35.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	14.00 to 15.00
Machine shop turn.	1.00 to 2.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	10.00 to 11.00
Low phos. plate	54.00 to 55.00
Structural and plate, 2 ft. and under	52.00 to 53.00
Rails, 2 ft. and under	44.00 to 45.00
Scrap rails, random lgth.	24.00 to 25.00
No. 1 machinery cast	67.00 to 68.00
No. 1 cupola cast	46.00 to 47.00

St. Louis

No. 1 hvy. melting	$ 50.00 to $ 51.00
No. 2 hvy. melting	42.00 to 43.00
Foundry steel, 2 ft.	42.00 to 43.00
No. 1 dealer bundles	50.00 to 51.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	30.00 to 31.00
No. 1 RR hvy. melting	50.00 to 51.00
Rails, random length	52.00 to 53.00
Rails, 18 in. and under	67.00 to 68.00
RR specialties	80.00 to 81.00
Cupola cast	70.00 to 71.00
Heavy breakable cast	48.00 to 49.00
Stove plate	70.00 to 71.00
Cast iron car wheels	49.00 to 50.00
Rerolling rails	84.00 to 85.00
Unstripped motor blocks	55.00 to 56.00

Birmingham

No. 1 heavy melting	$ 56.00 to $ 57.00
No. 2 heavy melting	53.00 to 54.00
No. 1 dealer bundles	56.00 to 57.00
No. 2 bundles	43.00 to 44.00
No. 1 busheling	56.00 to 57.00
Shredder scrap	73.00 to 74.00
Machine shop. turn.	20.00 to 21.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	26.00 to 27.00
Electric furnace bundles	52.00 to 53.00
Elec. furnace, 3 ft. & under	53.00 to 54.00
Structural and plate, 2 ft.	73.00 to 74.00
Structural and plate, 4 ft.	67.00 to 68.00
No. 1 RR hvy. melting	54.00 to 55.00
Scrap rails, random lgth.	60.00 to 61.00
Rails, 18 in. and under	74.00 to 75.00
Angles and splice bars	65.00 to 66.00
No. 1 cupola cast	76.00 to 77.00
Unstripped motor blocks	55.00 to 56.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 32.00 to $ 33.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	4.00 to 5.00
Shoveling turnings	7.00 to 8.00
Cast iron borings	8.00 to 9.00
Low phos. 18 in. and under	58.00 to 59.00
Rails, random length	38.00 to 39.00
Rails, 2 ft. and under	66.00 to 67.00
No. 1 cupola cast	48.00 to 49.00
Heavy breakable cast	22.00 to 23.00
Drop broken cast	64.00 to 65.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 30.00 to $ 32.00
No. 2 hvy. melting	26.00 to 28.00
No. 2 dealer bundles	25.00 to 26.00
Mixed bor. and turn.	7.00 to 8.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	14.00 to 16.00
Clean cast. chem. borings	34.00 to 35.00
No. 1 machinery cast	94.00 to 95.00
Mixed yard cast	41.00 to 42.00
Heavy breakable cast	17.00 to 18.00
Stainless	
18-8 prepared solids	460.00 to 480.00
18-8 turnings	375.00 to 400.00
430 prepared solids	90.00 to 100.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 33.00 to $ 35.00
No. 2 hvy. melting	23.00 to 25.00
No. 1 dealer bundles	35.00 to 37.00
No. 2 bundles	20.00 to 22.00
No. 1 busheling	35.00 to 37.00
Shredder scrap	45.00 to 47.00
Machine shop turn.	1.00 to 2.00
Shoveling turnings	3.00 to 5.00
No. 1 machinery cast	100.00 to 105.00
Mixed cupola cast	28.00 to 30.00
Heavy breakable cast	4.00 to 6.00

San Francisco

No. 1 hvy. melting	$ 41.00 to $ 43.00
No. 2 hvy. melting	33.00 to 35.00
No. 1 dealer bundles	28.00 to 30.00
No. 2 dealer bundles	13.00 to 15.00
Machine shop turn.	5.00 to 7.00
Cast iron borings	5.00 to 7.00
No. 1 cupola cast	85.00 to 87.00

Los Angeles

No. 1 hvy. melting	$ 40.00 to $ 42.00
No. 2 hvy. melting	29.00 to 31.00
No. 1 dealer bundles	27.00 to 29.00
No. 2 dealer bundles	10.00 to 12.00
Machine shop turn.	5.00 to 7.00
Shoveling turnings	9.00 to 11.00
Cast iron borings	5.00 to 7.00
Elec. furnace, 1 ft. and under (foundry)	87.00 to 89.00
No. 1 cupola cast	89.00 to 91.00

Seattle

No. 1 hvy. melting	$ 56.00 to $ 58.00
No. 2 hvy. melting	45.00 to 47.00
No. 2 bundles	35.00 to 37.00
No. 1 cupola cast	91.00 to 93.00
Mixed yard cast	81.00 to 83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 53.00
No. 2 heavy melting cut 2 ft. and under	50.00
No. 1 dealer bundles	60.00
No. 2 bundles	18.00
Mixed steel scrap	32.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	28.00
Short steel turn.	31.00
Mixed bor. and turn.	20.00
Cast scrap	45.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to $ 56.00
No. 2 hvy. melting	43.00 to 44.00
No. 2 bundles	28.00 to 30.00
Machine shop turn.	8.00 to 9.00
Crushed turnings	22.00 to 24.00
Shredder scrap	55.00 to 56.00
Cut structural plate 2 ft. and under	77.00 to 78.00
Unstripped motor blocks	55.00 to 57.00
Cupola cast	64.00 to 66.00

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STEEL PRICES

Codes identify Producers listed in the Key on page 65. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10	$420.00
R3	$420.00
Midwest	
R3, U1, W5	$420.00
S1	$420.00
C10	$420.00
K2	$400.00
W5	$400.00
West	
B3(2)	$430.00
C6	$420.00
South	
A7	$420.00
Alloy, East	
R3, C10	$463.00
B3	$459.00
Midwest	
W8, W5	$459.00
S1, U1	$459.00
R3	$459.00
West	
B3	$469.00
C6	$469.00
South	
A7	$436.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7, N4	24.15
C20	22.90
W8	22.90
I3, T10, U1	23.90
West	
C6	22.85
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	24.15
W8	24.15
U1	23.90
I3	24.15
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	24.15
I3	24.15
West	
U1	24.40
C6	21.90
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut ll Edge—all widths, East	
B3, U1	20.80
J3	20.80
Midwest	
A7	20.80
D1	20.80
S1, J3, D1	20.80
W3	20.80
N4	17.50
W5	20.80
U1	20.80
B3, G2, I3, I4, M2, R3, J3, G3	20.80
West	
K1	20.80
B3	24.70
South	
R3	20.80
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
R7, S10, B4	29.60
P15	24.80
S7	Cmp*
U1	33.25
D1(1)	Cmp*
Midwest	
G4	24.80
I4	26.15
W14	22.95
S1, U1, J4	33.25
T4	Cmp*

*Composite pricing

West	
U1	33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, East (plus extras)*	
Midwest	
M2, G3, R3, W3, I4, J3, G2	20.80
A7	20.80
S1	20.80
I3	20.80
West	
K1	20.80
South	
R3	20.80
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	23.20
G4	25.80
I4	23.95
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	42.60
P15	32.10
S1	39.90
Midwest	
I4	41.75
S1	37.65

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	20.80
J3	20.80
U1	20.80
Midwest	
A7, U1, B3, G2, G3, I3, M2, R3, W3	20.80
S1, W5, D1	20.80
J3	20.80
I4	19.50
West	
U1	21.30
K1	20.80
South	
R3	20.80
Cold-Rolled, East, Class I	
B3(2), U1	24.65
J3	24.65
Midwest	
B3, I3, G3, R3, M2, U1(2)	24.65
G2, W3, M11	24.65
I4	22.00
J3, A7	24.65
S1, W5, D1	24.65
West	
U1	25.15
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	26.25
Midwest	
J3, D1	26.25
I3, W5, S1	27.15
U1, A7, R3, Y1	26.25
G2, W3, M11	26.25
West	
K1	27.15
South	
U1	26.25
R3	26.25
Enameling, Midwest	
A7, I3, U1, J3	26.15
S1	26.50
Long-Terne, Midwest	
W5	28.30
A7, U1	27.60
R3	27.60

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
B3	23.25
U1	22.35
South	
G7	22.35

Tinplate

Electrolytic Tinplate

	per base box
Single Reduced (70 lb)	
East	
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3 (75 lb)	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$25.44
U1	26.79
South	
U1	$26.29
Double Reduced (55 lb)	
Midwest	
M11 (50 lb)	$21.49
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$20.39
U1	21.99
South	
U1	$21.49

Black Plate

Single Reduced (75 lb)	
East	
B3	$23.36
Midwest	
J3	$23.36
M11	23.36
I3, U1, W5	23.36
W3	23.36
West	
K1	$24.01
U1	23.36
Double Reduced (55 lb)	
East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

**70 lb—base weight extra 45¢
***50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled
(Special quality)

East	
R3, K3	23.95
R5	23.95
B3(3), J3	23.95
U1, C10	23.95
Midwest	
A7, C20	23.95
N4	23.95
U1, I3, I4	23.95
R3, T10	24.075
K2	23.95
West	
B3	23.95
C6	24.45
U1	23.95
B3	24.70
South	
A8	20.65
A7	23.95
C16	23.95
Cold-Finished Carbon, East	
A11	22.15
J3(2)	31.50
R3	31.50
C21	21.15
J3, L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	29.50
M1	23.025
B4, C10	31.00
J3	31.50
Midwest	
B5, W10, Y1, W8, R3	31.00
J3	32.15
B1	19.80
L2	30.75
N9	31.00
P3	19.85
W14	22.20
J3(3)	31.00
B5	31.25
J3	32.15
West	
B5	31.20
B5	34.90
R3	31.20-34.90
South	
B5	32.85
J3	31.95
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10	26.10
R3	26.10
J3	26.10
Midwest	
A7, U1	26.10
I3, C10	26.10
R3	26.10
I4	24.85
West	
B3, U1	26.10
B5	18.50
C6	26.60
B3	27.10
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	35.40
M1	28.025
R4	25.65
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	35.40
Midwest	
B5, R3, C10	34.85
C2	28.275
J3, M9, W10	35.40
P3	22.75
B1	22.70
N9	34.85
L2	34.65
B5	35.10
J3	36.00
J3	34.85
West	
R3	35.20-38.25
B5	35.20
B5	38.25
South	
J3	35.40
C16	28.00
B5	36.75

Plates

Carbon Steel, East	
B3(2)	25.25
L4	24.25
P2	24.25
U1	24.25
J3	25.25
Midwest	
B3, G3, R3, G2, S1	25.25
I3, I4, W5	25.25
J3, A7	21.70
U1	24.25
West	
A7, B3, C6, O2	25.25
K1	23.50
U1	24.25
South	
R3	25.25
A7	25.25
U1	24.25
Alloy, East	
B3, J3	33.05
U1, L4	33.05
P2	32.05
Midwest	
B3	33.05
G2, G3	31.05
I4, U1	33.05
West	
B3	33.05
O2	30.55
K1	31.30
South	
A7	27.55

Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
A7, R3	24.60
N4, W7	27.40
K2	24.20
South	
U1	27.70
A8	22.85
West	
A7	25.95
C8	24.95

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Corp., Detroit
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
City Delivery Charge*	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	25.04	29.02	33.66	34.17	29.52	31.46	21.27	42.11	43.20	54.80	71.74	74.69
Baltimore	32.25	36.51	42.48	42.85	35.56	37.48	23.10	48.63	56.80	61.08	71.68	77.88
Birmingham	25.90	30.24	36.47	35.03	29.67	31.68	22.25	43.40	50.53	51.39	69.70	76.27
Boston	27.30	32.77	37.86	44.27	37.43	37.68	21.80	47.75	57.60	60.66	68.49	75.74
Buffalo	27.75	34.41	36.35	43.01	35.20	32.46	18.26	45.85	54.11	55.64	62.09	70.72
Chicago	26.20	30.50	30.15	31.83	29.41	29.80	16.89	42.43	38.12	47.10	57.97	59.33
Cincinnati	24.09	29.01	31.66	31.75	30.96	31.87	17.02	43.18	41.70	48.16	53.82	60.37
Cleveland	26.88	31.70	34.40	33.08	30.09	32.50	18.11	42.28	40.45	50.48	56.63	62.50
Denver	32.69	38.65	38.66	42.32	36.91	38.18	22.79	49.35	56.13	65.40	72.50	81.22
Detroit	26.57	31.41	33.26	32.65	29.45	31.24	17.20	42.95	39.88	47.93	53.72	60.20
Houston	28.50	32.64	36.06	41.35	34.12	37.90	47.18	42.45	56.79	64.97	73.05	81.09
Kansas City	27.04	29.22	34.19	32.39	32.19	33.18	20.29	44.35	50.64	58.69	64.36	73.32
Los Angeles	34.08	36.78	39.14	47.53	38.37	40.45	32.55	50.66	62.71	72.33	78.31	87.97
Memphis	30.25	29.07	33.57	36.74	30.58	31.81	23.10	36.09	52.82	56.96	67.85	77.44
Milwaukee	23.92	28.76	31.69	33.02	30.75	31.71	16.91	42.26	39.80	48.13	55.04	60.53
New York	23.42	27.61	30.77	42.40	31.67	32.93	20.83	48.87	50.98	59.83	68.45	75.35
Philadelphia	28.57	34.80	37.22	44.85	33.40	37.64	22.78	48.62	52.89	60.22	69.85	76.05
Pittsburgh	27.48	32.61	38.15	40.12	35.59	36.44	21.35	45.69	48.95	59.88	66.19	72.84
Portland	32.04	37.16	41.51	33.10	34.82	35.20	53.64	56.85	61.00	64.10	66.10	....
San Francisco	31.07	36.66	39.71	46.66	39.32	40.88	30.78	51.14	63.99	72.88	79.58	88.10
Seattle	29.85	35.14	37.68	46.76	32.89	35.32	29.86	51.38	64.02	70.14	73.83	87.67
Spokane	21.08	30.56	33.56	36.69	35.18	25.16	20.32	41.00	42.02	46.30	....	58.32
St. Louis	27.22	32.50	34.47	36.45	30.11	32.47	18.54	43.64	44.47	52.13	59.81	65.93
St. Paul	27.30	31.29	33.61	35.20	29.31	32.38	17.22	43.95	40.17	49.68	52.53	61.93

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ¾-2 15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1¾" round; Cold drawn—1" round; Hot-rolled 4140—1⅞" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

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STEEL/NONFERROUS EARNINGS REPORT

DEBT RESTRUCTURING IS NOT JUST FOR THE GIANTS

NOVEMBER 10, 1982

IRON AGE

THE MAGAZINE FOR METALWORKING MANAGEMENT

11/29/82
C2150-2

DETROIT'S BIG CHANGES UNDER THE HOOD

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VOL. 225, NO. 32

IRON AGE

NOVEMBER 10, 1982

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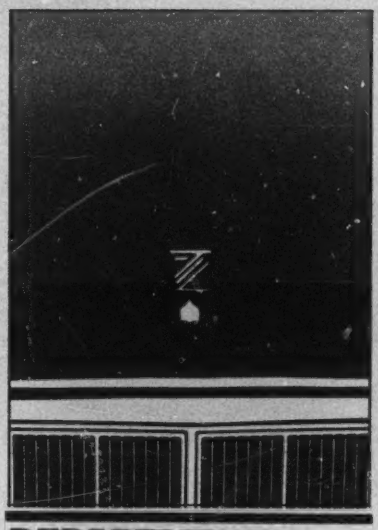

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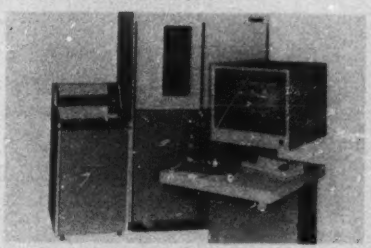

CAD/CAM—Turnkey system or in-house?

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STEEL AND NONFERROUS PRODUCE MORE RED INK

The steelmakers watched shipments decline in the third quarter, while nonferrous producers faced both depressed prices and lower sales volume.

By George J. McManus and Robert J. Regan

Third quarter financial results of steel companies were about as bad as had been expected.

Of the first 15 companies reporting, 13 lost money in the quarter. Even Carpenter Technology Corp., which has always been profitable, lost money in the third quarter.

United States Steel Corp. had an operating loss of nearly $290 million on its steel business. Bethlehem Steel Corp. had the largest net loss—$208 million. This was the second largest deficit in Bethlehem's history.

Among those reporting profits for the third quarter were Lukens Inc. and Nucor Corp. Tax credits of $764,000 swung Lukens into the black.

Nucor had a clear-cut profit of nearly $6 million. This was remarkable for a company operating in depressed and highly competitive markets. "We concentrate very hard on costs," said Samuel Siegel, financial vice president for Nucor. The company has been able to introduce a high degree of flexibility in its cost structure.

More typical of the industry as a whole is what happened to Republic Steel Corp. in the third quarter. Republic's shipments fell 16 pct from the poor second quarter. Dollar sales were off even more—over 20 pct.

The sharp dollar decline reflected "a negative swing in product mix and market pressures on prices in addition to the lower volume," said E. Bradley Jones, chairman of Republic. The net result was a net loss of more than $74 million for the company.

The 14 million tons shipped by the industry in the third quarter compared with 16 million tons in the second quarter of 1982 and with over 21 million tons in the third quarter of 1981. Price competition continued and any remaining oil country business disappeared.

Another factor in the third quarter was the Aug. 1 wage increase of 48¢ an hour. "Our huge steel segment losses are incurred in the face of rising hourly wage costs," said David M. Roderick, chairman of United States Steel Corp.

U. S. Steel cut its dividend in half, and Mr. Roderick noted that salary employees were sharing in the effects of bad times. "Wage earners must now join that effort or the basic steel industry has little prospect for sustained recovery," he said.

The start of the recovery has not yet been indicated by orders of U. S. Steel or others. "The business environment continued to worsen during the quarter and is not expected to improve in the last quarter," said Harry Holiday, chairman of Armco Inc.

At the moment, things are tough and steel companies are scrounging for cash.

"We see absolutely no change in the market," said Mr. Siegel of Nucor.

Steel executives are hopeful there is a change in the making. "The sequence of events necessary for a general business upturn is coming into place," said Mr. Jones of Republic.

Mr. Roderick feels declining interest rates "could help spark a modest consumer-led economic recovery beginning in the fourth quarter or in early 1983."

September auto sales were encouraging and the relative strength of the sheet market suggests the consumer sector is slowly reviving. With capital goods still sliding, however, fourth quarter prospects for steel are dim.

"All signs indicate that results from steel manufacturing operations in the fourth quarter will be even worse than the third," said Stephen A. Girard, chairman of Kaiser Steel Corp. Kaiser had a net loss of $24 million in the third quarter. The pre-tax loss of steel was $44.1 million.

One positive development is the recent agreement which limits carbon steel imports from Europe to about 5 pct of the U.S. market. Mr. Roderick said other limits must be established if this is to do any good.

"To this end," he said, "the corporation is looking closely at imports from Third World countries and Japan."

The Japanese have said their second half steel shipments to the U.S. will be down 50 pct from 1981. If that cut is already taking place, said an analyst, business conditions must be really awful. There has been no reflection of reduced imports in the orders of domestic mills, he added.

It is likely that Japan will agree to some kind of formal trade restraint. Even without this, said a domestic official, steel imports will be down 3 million tons next year.

At the moment, things are tough and steel companies are scrounging for cash. So far this year, U. S. Steel has taken in $750 million from the sale of assets. This is helping to reduce the $3 billion debt incurred in the acquisition of Marathon Oil. In the third quarter, U. S. Steel still had interest charges of more than $200 million.

Cost cutting continues. Inventories are being reduced below minimum levels. Inventory adjustments added $24 million to the net income of Armco Inc. in the third quarter.

This addition was more than offset by special charges of $70.6 million after taxes. A big item was $71.9 million due to writing down of Armco's investments in Falconbridge Dominicana. The company took a big write-off on raw materials in the second quarter.

Throughout the industry, people are taking a hard look at raw material policies. Domestic steel companies have traditionally relied on fixed commitments for iron ore. Either through direct ownership or take-or-pay contracts, the companies have been locked into domestic and Canadian ores.

This has been a problem in slack years like 1982. With rich ore deposits opening up in Brazil, American mills

Steel: The Red Ink Keeps Flowing

Millions of Dollars

	'82 E/S Pct	Earnings 3rd Q '82	Earnings 3rd Q '81	Earnings Pct Change	Sales 3rd Q '82	Sales 3rd Q '81	Sales Pct Change
USS	—	(82.40)	536.90	—	4,522.80	3,465.80	+30
Bethlehem	—	(208.9)	76.30	—	1,195.70	1,854.00	−36
Armco	—	(122.60)	67.10	—	1,202.90	1,743.40	−31
LTV	—	(58.3)	97.10	—	1,127.20	1,950.20	−42
National	—	(95.98)	34.58	—	803.00	1,078.33	−26
Inland	—	(45.10)	7.97	—	676.40	926.56	−27
Republic	—	(74.56)	92.73	—	592.76	744.87	−20
Total	—	(687.84)	912.68	—	10,120.76	11,763.16	−14
Cyclops	—	(1.47)	5.00	—	222.67	259.32	−14
Wheel-Pgh	—	(26.02)	4.07	—	193.97	282.98	−31
Interlake	0.8	1.40	12.30	−89	183.10	255.10	−28
Kaiser	—	(24.00)	21.55	—	172.10	295.45	−42
Nucor	4.9	5.99	6.14	−2.4	121.11	136.00	−11
Lukens	0.3	0.33	2.50	−86.8	117.30	126.23	−7.1
Carpenter	—	(0.33)	6.99	—	86.81	123.66	−30
Copperweld	—	(9.13)	10.11	—	74.52	161.43	−54
CF&I	—	(12.01)	9.30	—	65.48	187.31	−65
Laclede	—	(0.46)	(0.92)	—	42.86	61.52	−30
Eastmet	—	(.70)	(2.62)	—	37.03	68.37	−46
Phoenix	—	(10.26)	0.37	—	22.54	54.22	−58

Nonferrous: A Quarter Without Luster

Millions of Dollars

	Earnings 3rd Q '82	Earnings 3rd Q '81	Earnings Pct Change	Sales and Other Revenues 3rd Q '82	Sales and Other Revenues 3rd Q '81	Sales and Other Revenues Pct Change
Alcan	(15.0)	67.0	—	1,194.0	1,223.0	−2.4
Alcoa	(14.4)	81.3	—	1,145.2	1,284.3	−10.8
Amax	(97.1)	51.4	—	517.1	656.6	−21.2
Asarco	(56.8)	6.3	—	329.1	402.3	−18
Brush Wellman	3.2	3.8	−15.8	46.0	47.7	−3.6
Callahan Mining	1.4	3.3	−57.6	6.2	10.0	−38.0
Cominco	(19.8)	16.1	—	276.4	322.8	−14.4
Engelhard	17.1	17.8	−3.9	533.2	503.4	+5.9
Freeport-McRoran	34.3	44.3	−22.6	186.1	202.8	−8.2
Hecla Mining	2.4	(0.4)	—	13.0	16.9	−23.1
Inco	(66.4)	(29.5)	—	233.0	367.2	−36.5
Insilco	(3.7)	10.2	—	168.9	162.6	+3.9
Kaiser Aluminum	63.3	12.3	+414.6	895.6	794.3	+12.8
Martin Marietta	38.0	60.6	−37.3	892.0	835.9	+6.7
Olin Corp.	11.2	17.7	−36.7	433.9	489.9	−11.4
Phelps Dodge	(26.3)	2.6	—	206.3	344.2	−40.1
Phibro-Salomon	134.0	79.0	+69.6	6,538.0	6,563.0	−0.3
Reynolds Metals	(11.6)	29.5	—	759.3	902.7	−15.9

( ) denotes loss

Asarco. Net loss for 3rd quarter of 1982 includes extraordinary charge of $51 million related to Chapter 11 filing by 33 pct-owned Revere Copper and Brass, Inc. **Callahan Mining.** Net for 3rd quarter of 1981 includes a $2,570,000 gain from sale of investments. **Cominco.** Canadian funds. **Hecla Mining.** Loss for third quarter of '81 includes an extra charge of $78,000. **Inco.** Loss for third quarter of '81 includes $10,694,000 loss from discontinued operations. **Insilco.** Loss for third quarter '82 includes $10,630,000 loss from discontinued operations; net for third quarter '81 includes $805,000 gain from discontinued operations. **Kaiser Aluminum.** Results for third quarter '82 include a pre-tax non-recurring gain of $180.6 million from sale of natural gas rights; operating loss for the quarter was $107.3 million.

say foreign producers now have an edge on ore costs. It's argued that U.S. companies should rely more on open market purchases.

One of Nucor's advantages is that it relies on open market purchases of scrap. This provides a hedge against recessions. When demand for steel drops, the price of scrap tends to come down.

Also trending downward in a slump are Nucor's employment costs. Compensation for Nucor's officers is based to a large extent on bonuses that start when return on equity reaches 10 pct. The third quarter return was 8 pct. This was good by steel standards, but it meant the pay of officers was reduced something like 65 pct (including a 5 pct base pay cut).

Compensation of Nucor's department heads was reduced by a scheme that relates bonuses to return on division assets. The pay rates of direct production workers haven't been changed, but most of them are working only four days a week.

This flexiblity has made for financial strength. Nucor had a 4.9 pct return on sales in the third quarter. The company's debt was reduced from 28.3 pct of invested capital at the start of the year to 17.8 pct in the third quarter. Flowing from this was a reduction of interest charges from $3.9 million at the start of 1982 to $1.6 million in the third quarter of 1982.

"We make a lot of mistakes," said Mr. Siegel.

Nucor's well-being must mean that other people are making more, he said.

Nonferrous

The third quarter showing for leading nonferrous metal companies reads more like a casualty list than a tabulation of sales and profits.

Red ink ran from aluminum through copper to nickel and one company, Revere Copper & Brass Inc., filed for protection under Chapter 11 of the Bankruptcy Act.

Revere is a producer of primary aluminum and a fabricator of aluminum and copper products.

The nonferrous producers continued to reel from the one-two punch of depressed prices (below the cost of production in most cases, according to the producers) and lower sales volume.

Demand was down in key hard goods sectors of the economy, including cars, houses and major appliances. None showed any early reaction (during the third quarter, at least) to the anticipated stimuli from the mid-year tax cut and the more recent downtrend in interest rates.

The metal fabricators and manufacturers, most of whom have demand and profits problems of their own, continued to operate from hand-to-mouth inventory programs. Metals producers, meanwhile, wrestled with the problem of paring down their own stocks via stiff production cuts and conversion to cash at distress prices.

Although the aluminum producers (in the U.S., at least) have been cutting production severely as far back as late 1981, the effect has been very slow showing up in the inventory columns—in the U.S. or abroad. Going into September, for instance, the U.S. aluminum industry's inventory of ingot, mill products and scrap was down only 1 pct from the start of 1982.

Alcoa reported its first quarterly loss since it began reporting results on a quarterly basis.

Aluminum Co. of America (Alcoa) reported its first quarterly loss ($14.4 million) since it began reporting results on a quarterly basis in 1951. Third quarter shipments of aluminum products were about on par with the year-earlier period, but gross revenues were down nearly 11 pct, reflecting depressed price realizations.

Alcoa cut its quarterly dividend by a third, to 30¢ a share, as part of its cash-conservation program. It was Alcoa's first dividend cut in 43 years.

Alcan Aluminium Ltd. sustained a $15 million loss in the third quarter despite a 13 pct rise in shipments. David M. Culver, president and CEO, said the near term outlook for earnings was "not encouraging, given the continuing uncertainty as to the timing of the recovery in aluminum demand and prices."

Reynolds Metals Co.'s third quarter loss was $11.6 million, reflecting a 17.3 pct drop in shipments and a 15.9 pct drop in dollar sales volume. David P. Reynolds, its chairman, said there were signs pointing to a general economic recovery, but the aluminum producer expected the early stages would be weaker than usual, particularly in the transportation and construction markets.

Kaiser Aluminum & Chemical Corp. had a $107.3 million operating loss, but showed net income of $63.3 million because of a pre-tax gain of $180.6 million from sale of natural gas contract rights. Kaiser Chairman Cornell C. Maier said there were still "no clear, continuing signs of the kind of pickup in demand needed to improve prices" and the company expects to remain in the red during the current period.

Things weren't any better for the copper producers during the third quarter. Prices were not as severely depressed as aluminum prices were, but they were below production costs in most cases, nonetheless. The response of producers' inventory levels to stringent production cutting was just about as slow as it was in aluminum. And it wasn't until late in the third quarter that the first modest signs of lower inventories began to show up.

Phelps Dodge Corp. showed a $26.3 million loss in the third quarter which brought the nine-month deficit to $64.8 million. The company said losses continued to reflect depressed prices for copper, which it said were at a 50-year low in real terms. In addition, it does not see any return to profitability "until an economic recovery supports increased business activity among customers."

Phelps Dodge said most economists hold that such a recovery has been frustrated thus far in 1982 by "high real interest rates," and added that the recent decline in money rates was encouraging.

Revere Copper & Brass said its copper and brass fabricating operations generated profits in the third quarter, as did its aluminum extrusions and foil, utensils and specialty products operations.

What necessitated the filing under Chapter 11, said Revere President William F. Collins, was "massive and continuing losses, as well as projected further losses from its primary aluminum operations and significant, although less substantial losses, from its aluminum rolling operations."

Amax Inc., a major producer of copper, aluminum, lead, zinc, molybdenum, sustained a $97.1 million loss in the third quarter, compared with net income of $51.4 million in the same period of 1981.

Inco Ltd., the world's largest nickel producer, reported a $29.4 million net loss for the third quarter. Inco said the loss reflected lower nickel deliveries and lower prices for primary metals and alloy products. Inco's inventory of finished nickel stood at 143 million lbs going into the final quarter of 1982, down from the 157 million lbs held at midyear and the 160 million lbs in stock a year earlier.

The drop reflected stringent production curbs, including a decision early in the current period to delay the restarting of the Ontario Division facilities to April 4 from the Jan. 3 date originally scheduled. □

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METALWORKING PRICE TRENDS

Disinflation rolls on, and it looks like it will for some time.

Disinflation in metalworking product lines continued in September and, it appears from many signs, that price softening stayed right on track through October.

There is, of course, no mystery to the price-cooling trend. In September, for example, when producer prices showed a month-to-month decline, so did industrial production and plant capacity usage. Simply, prices have cooled because demand has cooled.

The U.S. Labor Dept. has noted that producer prices for finished goods declined a seasonally adjusted 0.1 pct in September. That marked the fourth month out of the last eight where these prices actually declined.

There was, however, a one-time factor at work in the September finished goods price decline. During the month, automakers sharply cut the prices they charge dealers in an effort to clear out autos as the 1982 model year came to a close. These cuts accounted for about two-thirds of the overall producer price slowdown for the month.

The sharpness of the September price cuts in motor vehicles shows up in the table here. Prices of passenger cars went down a whopping 7 pct during the month.

Notably, in September, prices of capital equipment fell 0.4 pct from the previous month. Again, it was the sharp cutback in motor vehicle prices that accounted for most of the trimming of capital goods tags. But there was still widespread price weakness in capital goods lines.

Metalworking has been bearing the brunt of the recent disinflation tide. The table shows that in September, 12 of the 21 listed metalworking product lines had actual declines in selling prices or had no price changes during the month. That number is a high for this list since the start of the price weakening move early in the year.

On a 12-month basis, the price rise for all producer finished goods came to 3.6 pct in September. In the case of the 21 metalworking product lines on the table, the 12-month average price increase came to a paltry 0.2 pct.

There are as yet few signs of firming in market demand for metalworking goods. This points to continued price softness. And with forecasts of a turnaround in the economy being generally pushed out further in time, it looks like disinflation could be around for a long time.

Latest Month Covered: September, 1982

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	372.0	+ .3	+ 7.0
Metal Forming Machine Tools	410.6	− .1	+ 5.8
Agricultural Machinery & Equip.	313.6	+ .7	+ 7.1
Construction Machinery & Equip.	347.5	+ .3	+ 6.4
Industrial Process Furnace & Ovens	355.1	+ .1	+ 5.2
Industrial Material Handling Equip.	285.8	NC	+ 1.3
Pumps, Compressors & Allied Equip.	348.0	+ .1	+ 5.3
Fluid Power Equip. (Dec. 1970 = 100)	245.9	NC	+ 8.9
Mechanical Power Transmission Equip.	315.1	− .1	+ 4.8
Automobiles	201.0	+ 7.0	+ 2.5
Motor Trucks—Light	256.7	− 3.5	+10.6
Motor Trucks—Heavy	289.3	− 4.1	− .7
Railroad Equipment	354.7	NC	+ 4.7
Fabricated Metal Structural Products	304.2	− .1	+ 1.4
Electric Motors	290.8	+ .7	+ .8
Valves & Fittings	323.1	− .1	+ 2.0
Ball & Roller Bearings	335.3	NC	+ 5.4
Cutting Tools & Accessories	271.7	+ .1	+ 4.0
Heating Equipment	239.3	+ .3	+ 4.7
Plumbing Fixtures & Brass Fittings	277.0	+ .8	+ 2.0
Metal Containers	328.7	NC	+ 3.1
Miscellaneous Metal Products	289.3	+ .1	+ 5.7

Data based on U.S. Labor Dept.'s Producer Price Index

DETROIT'S BIG CHANGES UNDER THE HOOD

Lighter weight is still the main concern. As a result experimentation with alternate materials continues to move ahead through the industry.

By Bryon H. Berry

Automakers are making engines smaller, thinner, lighter, and more fuel efficient. They are using less aluminum and plastic than they predicted.

"Five or ten years ago," says Eudell G. Jacobsen, staff engineer, advanced product engineering, General Motors Technical Center, "the average engine throughout GM was almost 6mm thick. Now we're under 5mm. I'd like to see that drop below 3mm in five years. The thickness of the engine wall could drop to 1½mm and still carry the stress loads."

By contrast, the sheet metal used on car body is 1mm thick.

The 2.8-liter V6 engine introduced throughout GM in 1979 is 3mm thick, 2mm thinner than the previous V6. That saved, perhaps, just one pound in each engine. Consider the cost of processing, however, and the several million engines GM makes, and you see the magnitude of the savings.

"We're making the walls as absolutely thin as we can," says Mr. Jacobsen. "We're eliminating the excess material that we used to put on the castings to resist the pressures of broaching. The machine tool producers are reducing the pressures of the tools, including the broaches."

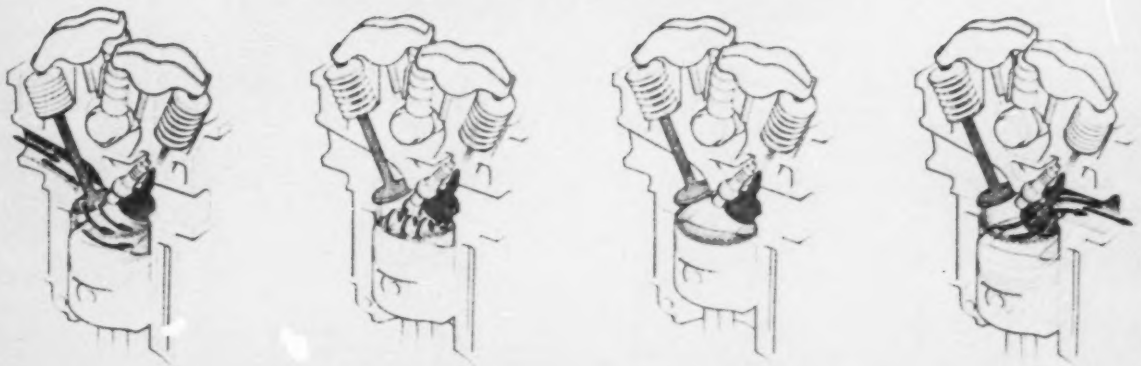
Automakers are limited only by the ability of foundries to cast thin engine walls.

"We're pushing foundry technology," says Mr. Jacobsen, "into setting cores more accurately. We're pushing the technology to use cores to make entire cylinder blocks instead of casting them in green sand."

GM and Ford are beginning to use the lost-foam method of casting. At Ford's Essex foundry in Windsor, Ont., the Styrofoam core evaporates. Left behind is the intake manifold on Ford's 3.8-liter V6 aluminum engine. Ford began pilot production with the lost-foam process earlier this year.

"We'd like to use the lost-foam method," says Henry A. Nickol, chief

Four Cycles of an Engine



A sculptured crown on the piston for the Ford Compound Valve Hemispherical (CVH) engine causes a "squish" effect on the air and fuel coming into the combustion chamber for faster, more complete combustion. The crown creates a turbulence that better mixes the air and fuel, and inhibits detonation at the outer extremes of the chamber, promoting efficient combustion and flame speed at the center. The result is improved fuel economy and reduced emissions. Drawing shows the four cycles of engine (from left to right): intake, compression, ignition, and exhaust.

powertrain and chassis engineer at Ford Motor Co.'s powertrain and chassis product engineering department, "for all our aluminum castings, particularly when the shape is intricate and surface finish important. Thus far, the quality of the castings at Essex is excellent. We'd like to use lost foam in good volume by 1985."

GM's Central Foundry is using lost-foam casting to make aluminum heads for Oldsmobile's 4.3-liter, 6-cylinder diesel engines.

Automakers also are pushing foundries to cast engines with minimal distance between the bores. They want to cut out as much space as possible without "siamesing the bores," that is, casting the bores too close together.

While asking foundries for smoother, lighter, smaller castings, automakers also are considering using sheet-metal stampings for parts usually cast. Already some accessory brackets are stamped. So are some water pumps, water-pump impellers, and enclosures.

The more complex the shape, of course, the more likely it is to be cast. Stampings are less expensive than castings, but the welding and copper brazing required to join stamped parts adds cost. In the 1940s, an entire engine was built of stampings. Its name, Cobra, stood for copper brazing.

"I don't think we'll see any more engines made entirely of stampings," says Mr. Jacobsen, "but we'll continue to study making parts by stampings instead of castings."

Automakers are using aluminum instead of iron only when they must cut weight.

"Aluminum costs about ten times more than iron," says one engineer, "on a per pound basis. On a volume basis, aluminum still is four times more expensive than iron."

All the U.S. automakers are using aluminum for the cylinder heads. None is using aluminum for the engine blocks. Overseas, however, Porsche, Mercedes Benz, and Honda are making aluminum blocks for specialty sports cars.

"There are many problems with using aluminum for an engine block," says John D. Withrow, vice president, engineering, Chrysler. "You can't use aluminum for the walls inside the cylinders, because it just won't wear. So you have to put in steel sleeves. Then you have to figure out whether to have wet or dry walls and how to keep the sleeves in place."

Ford is testing an engine made of fiber-reinforced plastic. Still, most engineers foresee no structural engine parts made of plastic in the next ten years.

"On a per pound basis," says one engineer, "plastic costs about $25 a pound and cast iron, 10 cents."

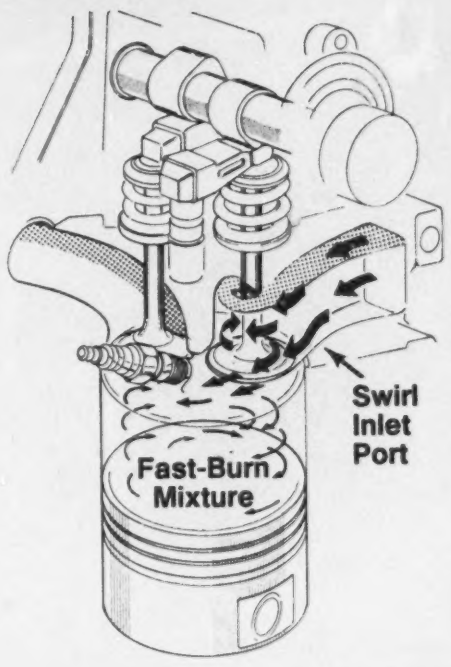
Still, automakers are saving weight by using plastic oil pans, rocker covers, electronic parts, air cleaners, ducts, housings for such parts as emission-control valves, and other accessory parts. In addition, they are using fiber-reinforced material for such parts as connecting rods, push rods, and rocker arms.

"I see an increasing usage of ceramics," says one engineer, "in the prechambers and heat shields of diesel engines. In gasoline engines, ceramics will be used to reduce friction and resist corrosion."

"Plastics have a problem maintaining shape," says another engineer. "In one project, a plastic part sagged just sitting on the shelf."

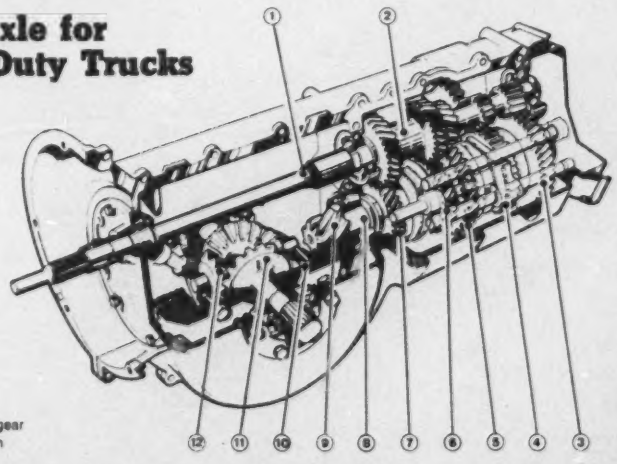
To improve manufacturing efficiency, General Motors wants to mass-produce engine bores and pistons at a common size. Presently the company allows a wider range of specifications and se-

Fast Burn



Cylinder head of Chevette 1.6-liter engine increases fuel mixture velocity and speeds the combustion process. Mixture swirls through valve opening into cylinder cavity. Faster burn allows higher compression ratio, even on regular unleaded gasoline.

Transaxle for Light Duty Trucks



1- Input shaft
2- Layshaft
3- 1st gear
4- Reverse
5- 2nd gear
6- 3rd gear
7- 4th gear
8- Mainshaft
9- Drive pinion
10- Ring gear
11- Differential side gear
12- Differential pinion

Source: Peugeot

Advances in Engine Technology

In Past Two Years Gasoline Engine Technology	Percent of Replies
Electronic controls	46
Closed-loop feedback fuel control	14
Fast-burn combustion	13
Throttle-body fuel injection	5
Lean burn	5
Size and weight reduction	4
4-6-8 engine	4
Low friction	3
Other (See Discussion)	6
	100
Diesel Engine Technology	
Fuel injection	19
Improved cold starting	16
Size and weight reduction	16
Improved emission control	14
Electronic controls	11
Other (See Discussion)	24
	100

By 1985 Gasoline Engine	Percent of Replies
Electronic controls	27
Air/fuel improvements (throttle-body injection, electronic fuel injection)	18
Combustion chamber improvements	11
Friction reduction	11
New engine materials	10
Fast burn combustion	5
Decreased accessory power requirements	5
Supercharging/turbocharging	4
Stratified charge	3
Turbulence control	3
Plastic engine materials	3
	100
Diesel Engine	
Electronic controls	26
Combustion chamber design (direct injection or open chamber)	22
Improved fuel injection	10
Supercharging/turbocharging	10
Light-weight engine	8
Particulate trap	6
Aluminum engine	5
Emission reduction	5
Improved fuel metering	4
Friction reduction	4
	100

lectively fits each piston to a bore after manufacture.

"We're trying to pay more attention," says Mr. Jacobsen, "to the precision of our surface fits and finishes and clearances. With smoother surfaces, we'll be able to use smaller bearings and reduce the friction and the ring tensions."

Ford's design engineers are going onto the plant floor to tell production workers about problems customers are having with their engines. In return, the hourly workers suggest ways to improve ease of manufacture.

Both General Motors and Chrysler are running engines of different size down the same line. On one line Chrysler can make both gas and diesel engines with three, four, five, or six cylinders and displacements from 1.5 to 2.5 liters. On another line, Chrysler can make both four- and five-speed transmissions.

Engineers at Chrysler and GM designed the critical dimensions of these engines and transmissions to be the same; only the length varies.

"We're studying a line that would flex from a V6 to a V8 and back again," says one Ford engineer, "some time in the late 1980s. That would work if we didn't have a demand high enough for either engine alone but did have enough demand for both."

All Ford's plants are using statistical process control, but not throughout the entire plant. Within three years the process should spread throughout the plants.

"The future challenges facing the auto industry," says Ford President Donald E. Petersen, "require an even greater emphasis on research and development in such crucial areas as aerodynamics, electronics, powertrain technology, new materials, alternative fuels, hybrid vehicles, and computer-aided design and manufacturing."

"There is no question," says Thomas J. Feaheny, vice president, vehicle research, engineering and research staff, "that fuel economy, or really energy efficiency, is top priority right now. In powertrain research we are looking at absolutely everything, including a lot of ideas that have been considered in the past and rejected. We're researching turbochargers and superchargers; turbo-compound engines; three-cylinder engines, two-stroke cycle engines, variable compression ratios, variable valve timing, direct injection diesel and gasoline, idle and decel shutoff and regenerative braking.

"We're looking at applications of new materials, including ceramics inside the reciprocating engine that would conserve heat and improve the thermal efficiency of the reciprocating engine; and, of course, we're also looking at ceramics on gas turbines.

"We're looking at graphite-reinforced fibers as a possible way of reducing the weight of the reciprocating engine and improving its efficiency.

"We are attacking friction and parasitic losses throughout the powertrain and the rest of the vehicle.

Fast burn is the top goal of all auto engineers working on combustion in the engine. It delivers lots of good things: no knock; fewer emissions of oxides of nitrogen (NO_x); less pumping losses; higher fuel economy; and a higher compression ratio, which means more thermodynamic efficiency.

"As you ignite the charge," says Mr. Jacobsen, "it starts burning out from that ignition source in a spherical front. As it burns out, it pushes burned gases in front of it. As they're pushed, these unburned gases get more compressed, which raises their temperature and causes them to start burning on their own, uncontrollably. They burn back in the other direction and cause collisions and vibrations—in short, knock.

"However, you can eliminate knock if you can go through the burn cycle of the fuel/air fast enough so that combustion is all over by the time the compressed gases burn back."

"There are a lot of approaches to the goal of a fast burn," says Mr. Withrow. "There's a lot of work that needs to be done in preparing the fuel/air mix, mixing it, heating it by compression, and getting it in the right position. To get fast burn, you can modify the design of the combustion chamber, intake valve, or piston. You can change the shape of the piston so that it compresses all the fuel/air at the same time toward the

By 1990	Percent of Replies
Gasoline Engine	
Electronic controls	21
New engine materials	19
Combustion chamber modification	16
Friction reduction	10
Electronic fuel injection	10
Fuel and lubricant additives	10
Stratified charge	7
Supercharging/turbocharging	7
	100
Diesel Engine	
Open combustion chamber	20
Electronic control	20
Supercharging/turbocharging	20
Ceramic materials	11
Turbo/compounding	11
Improved combustion chambers	6
Adiabatic engines	6
Other material advances	6
	100

Source: Office for Study of Automotive Transportation, University of Michigan. The university interviewed executives with automakers and suppliers of materials and parts.

spark plug. You can change the timing of the intake valve.

"The solution has to be tailored to each individual engine. There is no one right answer."

"To us," says Mr. Nickol, "fast burn is synonymous with lean burn. We can improve fuel economy 3 to 5 pct by the higher compression ratio of fast burn. All our engines will be fast-burn as fast as we can get there. Next year more than 40 pct of our engines will have some degree of fast burn.

Typical of Ford's approach to fast burn is the High Swirl Combustion (HSC) engine due next year in its Tempo/Topaz, which will replace the Fairmont/Zephyr.

"Compared to most other engines of the same displacement," says Mr. Nickol, "this 2.3-liter engine will have a 20 to 25 pct faster burn rate, get 10 to 14 pct better fuel economy, and reduce friction by 20 pct.

The fuel/air will swirl in a circular motion at a very high rate, 6000 rpm, equal to the fastest in the world. The HSC uses an overhead valve, not an overhead cam. It can be mounted under the hood either north/south or east/west, that is, either longitudinally or transversely."

"Reducing friction," says Mr. Jacobsen, "is an important goal. We can do that by lower-tension rings, valve trains, and seals; more efficient accessory drives, pumps, and pistons; smaller bearings; and lower-viscosity, friction-modified oils."

Automakers and their suppliers are cutting the horsepower that accessories soak up from the engine. An air conditioner, for example, consumes 30 pct of the fuel that powers a four-cylinder engine in a small car crossing a desert in the U.S. Southwest.

All U.S. cars likely will use throttle-body fuel-injection by 1987. Usually fuel injection is coupled with a closed-loop feedback control: a sensor in the exhaust stream that measures and optimizes the air/fuel mix.

"Virtually all passenger-car calibrations," says Mr. Nickol, "will have feedback control in order to meet the 1984 altitude emission standards."

By controlling fuel flow more precisely, fuel injection can increase horsepower, torque, and driveability.

Fuel injection is but one example of the growing number of electronic controls under the hood.

"Besides controlling the fuel/air ratio," says Mr. Withrow, "electronics can control all the other variables in the engine, including the spark, the exhaust gas recirculation (EGR), and maybe even the valve timing. Through electronics we're going to continue to tighten the noose around perfection."

"The next step in electronic controls," says Mr. Nickol, "is to use them to control the powertrain; such things as the shift points and torque converter lockup of transmissions. Next year we'll use height sensors to adjust the suspension and control the ride."

Ford has customized its electronic controls. Its 1983 models use the fourth generation of its electronic engine controls: EEC-IV. Its one microprocessor and two MROM have enough capacity to handle Ford engines through the rest of this decade.

"I forecast tremendous progress," says Mr. Nickol, "in reducing the cost and size of sensors.

"Their design and location are critical. They have to operate in all kinds of temperature, in dirt, and in oil mist."

Pressed to save weight to meet fuel-economy requirements, automakers are reconsidering turbochargers. Exhaust powers a fan, which pumps that extra fuel/air back into the engine and increases power dramatically.

The turbocharger is extremely hot—1200 to 1400 degrees F—and fast—20,000 rpm. That burns up many metals, so engineers must use a costly rare metal. An automaker might have to spend $200 to buy a turbocharger. Cost of the component and manufacture to the consumer: $400 to $600.

The high heat also increases NOx emissions.

"We figure turbocharging costs us a mile per gallon in fuel economy," says Mr. Withrow.

Both Mr. Jacobsen and Mr. Nickol say that gasoline engines likely will use turbocharging only in premium performance packages. Next year Ford will introduce a 2.3-liter, fuel-injected, turbocharged engine in the Mustang and Thunderbird.

"This package," says Mr. Nickol, "will raise the horsepower of this engine from 100 to 142 hp. By pressurizing the intake charge, we'll add six lbs of boost.

"This will be the fastest turbocharged four-cylinder engine sold in the U.S."

"Turbocharging won't be used in gas engines," says Mr. Jacobsen, "except for performance. However, it will be more widely used in diesel engines. The payback there is greater.

"A diesel engine produces significantly less power than a gas engine of the same displacement. Turbocharge the diesel, and it will produce the same power as the naturally aspirated gas engine.

"Also, the diesel combustion likes the elevated temperatures of turbocharging." Mr. Withrow takes a different approach: "We have to stop thinking about turbocharging as just for race cars. It's a way of getting a small engine to perform like a big engine." □

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EFFECTIVE OCTOBER 18, 1982

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	153	159	157	250
Buffalo	30	29	31	58
Pittsburgh	126	134	130	320
Youngstown	67	72	61	127
Cleveland	104	99	100	160
Detroit	96	95	110	152
Chicago	341	341	366	506
Cincinnati	65	68	67	96
St. Louis	57	54	51	86
Southern	73	73	74	240
Western	65	59	62	134
U.S. Production	1,177	1,183	1,209	2,129

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer..... gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/51.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective October 18, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	1,177	1,183	60,867	99,497
Capability Utilization Rate	39.8	40.0	49.9	81.4

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$203.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 52.50	$ 53.50	$ 55.50	$ 82.17
No. 2 bundles	$ 39.50	$ 39.50	$ 40.50	$ 57.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh ..	$ 55.50	$ 55.50	$ 57.50	$96.50
No. 1 steel, Philadelphia	55.50	58.50	59.50	70.50
No. 1 steel, Chicago.....	46.50	46.50	49.50	79.50
No. 1 bundles, Detroit...	47.50	47.50	47.50	83.50
Low Phos., Youngstown	58.50	58.50	63.50	95.50
No. 1 mach'y cast., Pgh	66.50	66.50	71.50	94.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	117.50
No. 1 mach'y cast., Chi.	103.50	103.50	103.50	122.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective October 18, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	71.00-72.00	70.00-72.00	10/15/82
Lead	23.00-29.00	24.00-29.00	10/5/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00-42.00	41.00-42.00	10/5/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.35-$1.45
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $428.25
Indium, dollars per troy oz..... $2.85-$4.00
Iridium, dollars per troy oz..... $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. .. $370-$380
Molybdenum, lb. tech. moly oxides, 20 lb. MO can ..... $6.85-$8.50
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz..... $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz..... $9.74
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Oct. 11—556.26 Oct. 14—559.57
Oct. 12—560.89 Oct. 15—558.91
Oct. 13—559.70

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	64⅛	53¼
Yellow brass	55¾	50⅝
Red brass	58¾	52¼
Comm. bronze	59½	52½
Mang. bronze	56	54¼
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	56
No. 2 copper wire	50
Light copper	41

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	52
No. 2 copper wire	46
Light copper	37
No. 1 composition	51
No. 1 comp. turnings	49
Hvy. yellow brass solids	32
Hvy. yellow brass turnings	25
Radiators	40

Aluminum

New mixed clips	25	—26
Old sheet	24	—25
Old cast	24	—25
Clean dry borings	24	—25

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	23	—24
Mixed L.C. clips	21	—22
Old sheets and cast	15	—16
Borings and turnings	12	—13
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	44	—45
No. 2 copper wire	37	—38
Light copper	32	—33
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	24	—25
Brass Pipe	28	—29
New soft brass clippings	36	—37

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	20	—21

Nickel

Nickel solids	115	—120
Nickel rod ends	115	—120
Nickel sheets, clips	115	—120
Nickel turnings	55	— 60

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

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EFFECTIVE OCTOBER 18, 1982

MATERIALS NEWSFRONT

(Effective October 18, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 55.00 to $ 56.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 dealer bundles	66.00 to 67.00
No. 1 factory bundles (auto)	60.00 to 61.00
No. 2 bundles	40.00 to 41.00
No. 1 busheling	69.00 to 70.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	18.00 to 19.00
Low phos. punchings plate	72.00 to 73.00
Heavy turnings	48.00 to 49.00
No. 1 RR hvy. melting	69.00 to 70.00
Rails 2 ft. and under	86.00 to 87.00
Scrap rails, random lgth.	82.00 to 83.00
RR specialties	73.00 to 74.00
No. 1 machinery cast	66.00 to 67.00
Cupola cast	59.00 to 60.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	500.00 to 510.00
18-8 turnings	400.00 to 410.00

Chicago

No. 1 hvy. melting	$ 46.00 to $ 47.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	58.00 to 59.00
No. 1 factory bundles (auto)	60.00 to 61.00
No. 2 dealer bundles	38.00 to 39.00
Unburned bundles	42.00 to 43.00
No. 1 busheling	57.00 to 58.00
Shredder scrap	57.00 to 58.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	33.00 to 34.00
Low phos. forge crop	79.00 to 80.00
Low phos. punchings plate ¼ in. and heavier	83.00 to 84.00
Low phos. 2 ft. and under	78.00 to 79.00
No. 1 RR hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	54.00 to 55.00
Reroller rails	85.00 to 86.00
Rails, 2 ft. and under	79.00 to 80.00
RR couplers and knuckles	72.00 to 73.00
RR car axles	102.00 to 103.00
No. 1 machinery cast	103.00 to 104.00
Cupola cast	89.00 to 90.00
Stove plate	76.00 to 77.00
Steel car wheels	63.00 to 64.00
Stainless	
18-8 bundles and solids	470.00 to 480.00
18-8 turnings	370.00 to 380.00
430 bundles and solids	110.00 to 120.00
430 turnings	70.00 to 75.00

Philadelphia

No. 1 hvy. melting	$ 54.00 to $ 57.00
No. 2 hvy. melting	48.00 to 51.00
No. 1 dealer bundles	65.00 to 68.00
No. 2 dealer bundles	38.00 to 41.00
No. 1 busheling	65.00 to 68.00
Shredder scrap	71.00 to 74.00
Machine shop turn.	18.00 to 21.00
Mixed bor. and turn.	18.00 to 21.00
Shoveling turnings	30.00 to 33.00
Clean cast chemical borings	40.00 to 43.00
Low phos. 5 ft. and under	62.00 to 65.00
Low phos. 2 ft. punchings	87.00 to 90.00
Electric furnace bundles	75.00 to 78.00
RR specialties	74.00 to 77.00
Rails, 2 ft. and under	89.00 to 92.00
Cupola cast	53.00 to 56.00
Heavy breakable cast	53.00 to 56.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 40.00 to $ 41.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	46.00 to 47.00
Drop forge flashings	26.00 to 27.00
Machine shop turn.	21.00 to 22.00
Mixed borings and turn.	13.00 to 14.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	17.00 to 18.00
Heavy breakable cast	29.00 to 30.00
Mixed cupola cast	45.00 to 46.00
Automobile cast	63.00 to 64.00
Stainless	
18-8 bundles and solids	415.00 to 425.00
18-8 turnings	305.00 to 315.00
430 bundles and solids	85.00 to 95.00

Youngstown

No. 1 hvy. melting	$ 52.00 to $ 53.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	54.00 to 55.00
No. 2 dealer bundles	33.00 to 34.00
Machine shop turn	4.00 to 5.00
Shoveling turnings	15.00 to 16.00
Low phos. plate	58.00 to 59.00
Electric furnace bundles	58.00 to 59.00
Galvanized bundles	49.00 to 50.00

Cleveland

No. 1 hvy. melting	$ 47.00 to $ 48.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	56.00 to 57.00
No. 1 factory bundles	56.00 to 57.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	58.00 to 59.00
Machine shop turn.	3.00 to 4.00
Mixed bor. and turn.	3.00 to 4.00
Shoveling turnings	6.00 to 7.00
Cast iron borings	6.00 to 7.00
Cut structural & plates, 2 ft. and under	78.00 to 79.00
Low phos. punchings plate	78.00 to 79.00
Drop forge flashings	33.00 to 34.00
Foundry steel, 2 ft. & under	62.00 to 63.00
No. 1 RR hvy melting	73.00 to 74.00
Rails, 2 ft. and under	87.00 to 88.00
Rails, 18 in. and under	88.00 to 89.00
Steel axle turnings	76.00 to 77.00
Railroad cast	94.00 to 95.00
No. 1 machinery cast	99.00 to 100.00
Cupola cast	94.00 to 95.00
Stove plate	69.00 to 70.00
Stainless	
18-8 bundles	400.00 to 410.00
18-8 turnings	305.00 to 315.00
430 bundles	90.00 to 100.00

Buffalo

No. 1 hvy. melting	$ 27.00 to $ 28.00
No. 2 hvy. melting	17.00 to 18.00
No. 1 busheling	34.00 to 35.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	14.00 to 15.00
Machine shop turn.	1.00 to 2.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	10.00 to 11.00
Low phos. plate	54.00 to 55.00
Structural and plate, 2 ft. and under	52.00 to 53.00
Rails, 2 ft. and under	44.00 to 45.00
Scrap rails, random lgth.	24.00 to 25.00
No. 1 machinery cast	67.00 to 68.00
No. 1 cupola cast	46.00 to 47.00

St. Louis

No. 1 hvy. melting	$ 50.00 to $ 51.00
No. 2 hvy. melting	42.00 to 43.00
Foundry steel, 2 ft.	42.00 to 43.00
No. 1 dealer bundles	50.00 to 51.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	30.00 to 31.00
No. 1 RR hvy. melting	50.00 to 51.00
Rails, random length	52.00 to 53.00
Rails, 18 in. and under	67.00 to 68.00
RR specialties	80.00 to 81.00
Cupola cast	70.00 to 71.00
Heavy breakable cast	48.00 to 49.00
Stove plate	70.00 to 71.00
Cast iron car wheels	49.00 to 50.00
Rerolling rails	84.00 to 85.00
Unstripped motor blocks	55.00 to 56.00

Birmingham

No. 1 heavy melting	$ 56.00 to $ 57.00
No. 2 heavy melting	53.00 to 54.00
No. 1 dealer bundles	56.00 to 57.00
No. 2 bundles	43.00 to 44.00
No. 1 busheling	51.00 to 52.00
Shredder scrap	73.00 to 74.00
Machine shop. turn.	20.00 to 21.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	26.00 to 27.00
Electric furnace bundles	52.00 to 53.00
Elec. furnace, 3 ft. & under	53.00 to 54.00
Structural and plate, 2 ft.	73.00 to 74.00
Structural and plate, 4 ft.	67.00 to 68.00
No. 1 RR hvy. melting	54.00 to 55.00
Scrap rails, random lgth.	60.00 to 61.00
Rails, 18 in. and under	74.00 to 75.00
Angles and splice bars	65.00 to 66.00
No. 1 cupola cast	76.00 to 77.00
Unstripped motor blocks	55.00 to 56.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 32.00 to $ 33.00
No. 2 hvy. melting	29.00 to 29.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	4.00 to 5.00
Shoveling turnings	5.00 to 6.00
Cast iron borings	7.00 to 8.00
Low phos. 18 in. and under	58.00 to 59.00
Rails, random length	38.00 to 39.00
Rails, 2 ft. and under	66.00 to 67.00
No. 1 cupola cast	47.00 to 48.00
Heavy breakable cast	22.00 to 23.00
Drop broken cast	63.00 to 64.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 30.00 to $ 32.00
No. 2 hvy. melting	26.00 to 28.00
No. 2 dealer bundles	25.00 to 26.00
Mixed bor. and turn.	7.00 to 8.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	14.00 to 16.00
Clean cast. chem. borings	34.00 to 35.00
No. 1 machinery cast	94.00 to 95.00
Mixed yard cast	41.00 to 42.00
Heavy breakable cast	17.00 to 18.00
Stainless	
18-8 prepared solids	440.00 to 450.00
18-8 turnings	375.00 to 400.00
430 prepared solids	90.00 to 100.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 33.00 to $ 35.00
No. 2 hvy. melting	23.00 to 25.00
No. 1 dealer bundles	35.00 to 37.00
No. 2 bundles	20.00 to 22.00
No. 1 busheling	35.00 to 37.00
Shredder scrap	45.00 to 47.00
Machine shop turn.	1.00 to 2.00
Shoveling turnings	3.00 to 5.00
No. 1 machinery cast	100.00 to 105.00
Mixed cupola cast	28.00 to 30.00
Heavy breakable cast	4.00 to 6.00

San Francisco

No. 1 hvy. melting	$ 41.00 to $ 43.00
No. 2 hvy. melting	33.00 to 35.00
No. 1 dealer bundles	28.00 to 30.00
No. 2 dealer bundles	13.00 to 15.00
Machine shop turn.	5.00 to 7.00
Cast iron borings	5.00 to 7.00
No. 1 cupola cast	85.00 to 87.00

Los Angeles

No. 1 hvy. melting	$ 40.00 to $ 42.00
No. 2 hvy. melting	29.00 to 31.00
No. 1 dealer bundles	27.00 to 29.00
No. 2 dealer bundles	10.00 to 12.00
Machine shop turn.	5.00 to 7.00
Shoveling turnings	9.00 to 11.00
Cast iron borings	5.00 to 7.00
Elec. furnace, 1 ft. and under (foundry)	87.00 to 89.00
No. 1 cupola cast	89.00 to 91.00

Seattle

No. 1 hvy. melting	$ 56.00 to $ 58.00
No. 2 hvy. melting	45.00 to 47.00
No. 2 bundles	35.00 to 37.00
No. 1 cupola cast	91.00 to 93.00
Mixed yard cast	81.00 to 83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 43.00
No. 2 heavy melting cut 2 ft. and under	40.00
No. 1 dealer bundles	50.00
No. 2 bundles	8.00
Mixed steel scrap	22.00
Bush. new fact. prep'd.	48.00
Bush. new fact. unprp'd.	40.00
Machine shop turn.	23.00
Short steel turn.	26.00
Mixed bor. and turn.	15.00
Cast scrap	35.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to $ 56.00
No. 2 hvy. melting	43.00 to 44.00
No. 2 bundles	28.00 to 30.00
Machine shop turn.	8.00 to 9.00
Crushed turnings	22.00 to 24.00
Shredder scrap	55.00 to 56.00
Cut structural plate 2 ft. and under	77.00 to 78.00
Unstripped motor blocks	55.00 to 57.00
Cupola cast	64.00 to 66.00

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EFFECTIVE OCTOBER 25, 1982

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	116	153	163	228
Buffalo	30	30	29	59
Pittsburgh	137	126	123	317
Youngstown	67	67	60	140
Cleveland	95	104	96	164
Detroit	103	96	107	148
Chicago	333	341	361	495
Cincinnati	64	65	54	105
St. Louis	55	57	57	87
Southern	61	73	72	216
Western	50	65	58	136
U.S. Production	1,111	1,177	1,180	2,095

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82, Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective October 25, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	1,111	1,177	62,173	101,479
Capability Utilization Rate	37.6	39.8	49.8	81.1

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$203.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 52.17	$ 52.50	$ 53.50	$ 82.17
No. 2 bundles	$ 39.17	$ 39.50	$ 39.50	$ 57.17

Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 54.50	$ 55.50	$ 55.50	$94.50
No. 1 steel, Philadelphia	55.50	55.50	58.50	70.50
No. 1 steel, Chicago	46.50	46.50	46.50	81.50
No. 1 bundles, Detroit	44.50	47.50	47.50	83.50
Low Phos., Youngstown	56.50	58.50	58.50	95.50
No. 1 mach'y cast., Pgh	64.50	66.50	71.50	94.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	117.50
No. 1 mach'y cast., Chi.	103.50	103.50	103.50	120.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective October 25, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	72.00	71.00-72.00	10/19/82
Lead	23.00-26.00	23.00-29.00	10/22/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00-42.00	41.00-42.00	10/5/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas .$2.00
Beryllium-aluminum 5% Be, per lb. contained Be.....$201.00
Beryllium-copper, per lb. cont. Be$121.00
Beryllium 97% powder 200.....$166.00
Bismuth, ton lots .....$1.35-$1.45
Cadmium, under one ton .....$1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode.....$12.50
Gold per troy oz. $418.60
Indium, dollars per troy oz.....$2.85-$4.00
Iridium, dollars per troy oz.....$600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$370-$380
Molybdenum, lb. tech. moly oxides, 20 lb. MO can .....$6.85-$8.50
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz.....$475
Rhodium, per troy oz.....$600.00
Silver ingots, per troy oz.....$10.11
Vanadium $4.94
Zirconium sponge.....$12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Oct. 18—Holiday
Oct. 19—558.91
Oct. 20—557.85
Oct. 21—557.59
Oct. 22—559.57

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	67½	58¼
Yellow brass	59¼	54⅛
Red brass	63	56½
Comm. bronze	64	57
Mang. bronze	58⅞	57⅛
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	57
No. 2 copper wire	51
Light copper	42

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	57
No. 2 copper wire	51
Light copper	42
No. 1 composition	53
No. 1 comp. turnings	47
Hvy. yellow brass solids	38
Hvy. yellow brass turnings	25
Radiators	41

Aluminum

New mixed clips	25	—26
Old sheet	24	—25
Old cast	24	—25
Clean dry borings	24	—25

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	23	—24
Mixed L.C. clips	21	—22
Old sheets and cast	15	—16
Borings and turnings	12	—13
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	44	—45
No. 2 copper wire	37	—38
Light copper	32	—33
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	24	—25
Brass Pipe	28	—29
New soft brass clippings	36	—37

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	20	—21

Nickel

Nickel solids	115	—120
Nickel rod ends	115	—120
Nickel sheets, clips	115	—120
Nickel turnings	55	— 60

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

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EFFECTIVE OCTOBER 25, 1982 MATERIALS NEWSFRONT

(Effective October 25, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 54.00 to $ 55.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 dealer bundles	65.00 to 66.00
No. 1 factory bundles (auto)	60.00 to 61.00
No. 2 bundles	39.00 to 40.00
No. 1 busheling	65.00 to 66.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	18.00 to 19.00
Low phos. punchings plate	69.00 to 70.00
Heavy turnings	48.00 to 49.00
No. 1 RR hvy. melting	69.00 to 70.00
Rails 2 ft. and under	86.00 to 87.00
Scrap rails, random lgth.	82.00 to 83.00
RR specialties	73.00 to 74.00
No. 1 machinery cast	64.00 to 65.00
Cupola cast	57.00 to 58.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	490.00 to 500.00
18-8 turnings	390.00 to 400.00

Chicago

No. 1 hvy. melting	$ 46.00 to $ 47.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	58.00 to 59.00
No. 1 factory bundles (auto)	60.00 to 61.00
No. 2 dealer bundles	38.00 to 39.00
No. 1 busheling	57.00 to 58.00
Shredder scrap	57.00 to 58.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	33.00 to 34.00
Low phos. forge crop	79.00 to 80.00
Low phos. punchings plate ¼ in. and heavier	83.00 to 84.00
Low phos. 2 ft. and under	78.00 to 79.00
No. 1 RR hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	54.00 to 55.00
Reroller rails	85.00 to 86.00
Rails, 2 ft. and under	79.00 to 80.00
RR couplers and knuckles	72.00 to 73.00
RR car axles	102.00 to 103.00
No. 1 machinery cast	103.00 to 104.00
Cupola cast	89.00 to 90.00
Stove plate	76.00 to 77.00
Steel car wheels	63.00 to 64.00
Stainless	
18-8 bundles and solids	460.00 to 470.00
18-8 turnings	360.00 to 370.00
430 bundles and solids	105.00 to 115.00
430 turnings	70.00 to 75.00

Philadelphia

No. 1 hvy. melting	$ 54.00 to $ 57.00
No. 2 hvy. melting	48.00 to 51.00
No. 1 dealer bundles	65.00 to 68.00
No. 2 dealer bundles	38.00 to 41.00
No. 1 busheling	65.00 to 68.00
Shredder scrap	71.00 to 74.00
Machine shop turn.	18.00 to 21.00
Mixed bor. and turn.	18.00 to 21.00
Shoveling turnings	30.00 to 33.00
Clean cast chemical borings	40.00 to 43.00
Low phos. 5 ft. and under	62.00 to 65.00
Low phos. 2 ft. punchings	87.00 to 90.00
Electric furnace bundles	75.00 to 78.00
RR specialties	74.00 to 77.00
Rails, 2 ft. and under	89.00 to 92.00
Cupola cast	53.00 to 56.00
Heavy breakable cast	53.00 to 56.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 37.00 to $ 38.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	43.00 to 44.00
Drop forge flashings	24.00 to 25.00
Machine shop turn.	21.00 to 22.00
Mixed borings and turn.	13.00 to 14.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	14.00 to 15.00
Heavy breakable cast	24.00 to 25.00
Mixed cupola cast	40.00 to 41.00
Automobile cast	58.00 to 59.00
Stainless	
18-8 bundles and solids	415.00 to 425.00
18-8 turnings	305.00 to 315.00
430 bundles and solids	85.00 to 95.00

Youngstown

No. 1 hvy. melting	$ 49.00 to $ 50.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	51.00 to 52.00
No. 2 dealer bundles	30.00 to 31.00
Machine shop turn.	3.00 to 4.00
Shoveling turnings	9.00 to 10.00
Low phos. plate	56.00 to 57.00
Electric furnace bundles	56.00 to 57.00
Galvanized bundles	44.00 to 45.00

Cleveland

No. 1 hvy. melting	$ 47.00 to $ 48.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	56.00 to 57.00
No. 1 factory bundles	56.00 to 57.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	58.00 to 59.00
Machine shop turn.	3.00 to 4.00
Mixed bor. and turn.	3.00 to 4.00
Shoveling turnings	6.00 to 7.00
Cast iron borings	6.00 to 7.00
Cut structural & plates, 2 ft. and under	78.00 to 79.00
Low phos. punchings plate	78.00 to 79.00
Drop forge flashings	33.00 to 34.00
Foundry steel, 2 ft. & under	62.00 to 63.00
No. 1 RR hvy melting	73.00 to 74.00
Rails, 2 ft. and under	87.00 to 88.00
Rails, 18 in. and under	88.00 to 89.00
Steel axle turnings	76.00 to 77.00
Railroad cast	94.00 to 95.00
No. 1 machinery cast	94.00 to 95.00
Cupola cast	94.00 to 95.00
Stove plate	69.00 to 70.00
Stainless	
18-8 bundles	400.00 to 410.00
18-8 turnings	305.00 to 315.00
430 bundles	90.00 to 100.00

Buffalo

No. 1 hvy. melting	$ 27.00 to $ 28.00
No. 2 hvy. melting	17.00 to 18.00
No. 1 busheling	34.00 to 35.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	14.00 to 15.00
Machine shop turn.	1.00 to 2.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	10.00 to 11.00
Low phos. plate	54.00 to 55.00
Structural and plate, 2 ft. and under	52.00 to 53.00
Rails, 2 ft. and under	44.00 to 45.00
Scrap rails, random lgth.	24.00 to 25.00
No. 1 machinery cast	67.00 to 68.00
No. 1 cupola cast	46.00 to 47.00

St. Louis

No. 1 hvy. melting	$ 50.00 to $ 51.00
No. 2 hvy. melting	42.00 to 43.00
Foundry steel, 2 ft.	42.00 to 43.00
No. 1 dealer bundles	50.00 to 51.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	30.00 to 31.00
No. 1 RR hvy. melting	50.00 to 51.00
Rails, random length	52.00 to 53.00
Rails, 18 in. and under	67.00 to 68.00
RR specialties	80.00 to 81.00
Cupola cast	70.00 to 71.00
Heavy breakable cast	48.00 to 49.00
Stove plate	70.00 to 71.00
Cast iron car wheels	49.00 to 50.00
Rerolling rails	84.00 to 85.00
Unstripped motor blocks	55.00 to 56.00

Birmingham

No. 1 heavy melting	$ 56.00 to $ 57.00
No. 2 heavy melting	53.00 to 54.00
No. 1 dealer bundles	56.00 to 57.00
No. 2 bundles	43.00 to 44.00
No. 1 busheling	51.00 to 52.00
Shredder scrap	73.00 to 74.00
Machine shop. turn.	20.00 to 21.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	26.00 to 27.00
Electric furnace bundles	52.00 to 53.00
Elec. furnace, 3 ft. & under	53.00 to 54.00
Structural and plate, 2 ft.	73.00 to 74.00
Structural and plate, 4 ft.	67.00 to 68.00
No. 1 RR hvy. melting	54.00 to 55.00
Scrap rails, random lgth.	60.00 to 61.00
Rails, 18 in. and under	74.00 to 75.00
Angles and splice bars	65.00 to 66.00
No. 1 cupola cast	76.00 to 77.00
Unstripped motor blocks	55.00 to 56.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 30.00 to $ 31.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	2.00 to 3.00
Shoveling turnings	4.00 to 5.00
Cast iron borings	5.00 to 6.00
Low phos. 18 in. and under	57.00 to 58.00
Rails, random length	37.00 to 38.00
Rails, 2 ft. and under	64.00 to 65.00
No. 1 cupola cast	45.00 to 46.00
Heavy breakable cast	21.00 to 22.00
Drop broken cast	60.00 to 61.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to $ 29.00
No. 2 hvy. melting	24.00 to 26.00
No. 2 dealer bundles	23.00 to 24.00
Mixed bor. and turn.	7.00 to 8.00
Machine shop turn.	4.00 to 5.00
Shoveling turnings	10.00 to 12.00
Clean cast. chem. borings	34.00 to 35.00
No. 1 machinery cast	89.00 to 90.00
Mixed yard cast	38.00 to 39.00
Heavy breakable cast	14.00 to 15.00
Stainless	
18-8 prepared solids	440.00 to 450.00
18-8 turnings	375.00 to 400.00
430 prepared solids	90.00 to 100.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 30.00 to $ 32.00
No. 2 hvy. melting	20.00 to 22.00
No. 1 dealer bundles	32.00 to 34.00
No. 2 bundles	20.00 to 22.00
No. 1 busheling	32.00 to 34.00
Shredder scrap	43.00 to 44.00
Machine shop turn.	1.00 to 2.00
Shoveling turnings	2.00 to 4.00
No. 1 machinery cast	100.00 to 105.00
Mixed cupola cast	25.00 to 27.00
Heavy breakable cast	4.00 to 6.00

San Francisco

No. 1 hvy. melting	$ 41.00 to $ 43.00
No. 2 hvy. melting	33.00 to 35.00
No. 1 dealer bundles	28.00 to 30.00
No. 2 dealer bundles	13.00 to 15.00
Machine shop turn.	5.00 to 7.00
Cast iron borings	5.00 to 7.00
No. 1 cupola cast	85.00 to 87.00

Los Angeles

No. 1 hvy. melting	$ 40.00 to $ 42.00
No. 2 hvy. melting	29.00 to 31.00
No. 1 dealer bundles	27.00 to 29.00
No. 2 dealer bundles	10.00 to 12.00
Machine shop turn.	5.00 to 7.00
Shoveling turnings	9.00 to 11.00
Cast iron borings	5.00 to 7.00
Elec. furnace, 1 ft. and under (foundry)	87.00 to 89.00
No. 1 cupola cast	89.00 to 91.00

Seattle

No. 1 hvy. melting	$ 56.00 to $ 58.00
No. 2 hvy. melting	45.00 to 47.00
No. 2 bundles	35.00 to 37.00
No. 1 cupola cast	91.00 to 93.00
Mixed yard cast	81.00 to 83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 43.00
No. 2 heavy melting cut 2 ft. and under	40.00
No. 1 dealer bundles	50.00
No. 2 bundles	8.00
Mixed steel scrap	22.00
Bush. new fact. prep'd.	48.00
Bush. new fact. unprp'd.	40.00
Machine shop turn.	23.00
Short steel turn.	26.00
Mixed bor. and turn.	15.00
Cast scrap	35.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to $ 56.00
No. 2 hvy. melting	43.00 to 44.00
No. 2 bundles	28.00 to 30.00
Machine shop turn.	8.00 to 9.00
Crushed turnings	22.00 to 24.00
Shredder scrap	55.00 to 56.00
Cut structural plate 2 ft. and under	77.00 to 78.00
Unstripped motor blocks	55.00 to 57.00
Cupola cast	64.00 to 66.00

Chilton's

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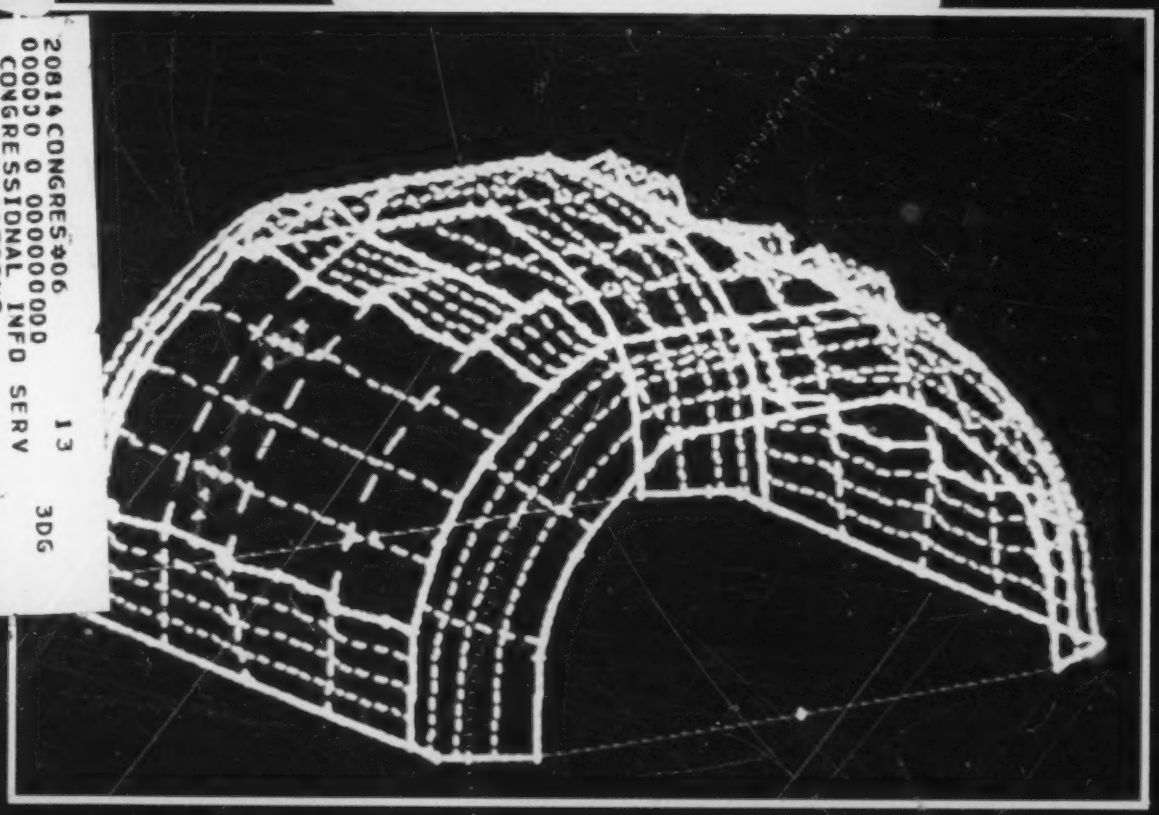

TURNKEY SYSTEM OR IN-HOUSE?

ELECTION '82 AND WHAT IT MEANS TO BUSINESS

CONSUMER BUYING — METALWORKING'S REAL ECONOMIC INDICATOR

HOW 'HIPPING' GIVES CASTINGS A FORGING QUALITY

VOL. 225, NO. 33

IRON AGE

NOVEMBER 19, 1982

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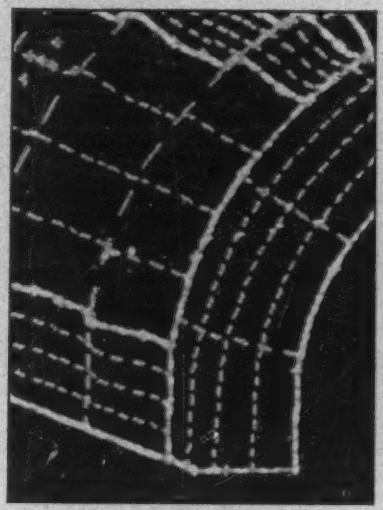

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BUSINESS FINANCEFRONT

Divestitures are now beginning to dominate merger scene

The merger pace weakened in the third quarter, down 8 pct from the same period in 1981. The big dollar mergers, so popular in recent years, have subsided considerably. And the number of divestitures continues to climb.

That's the way W. T. Grimm & Co., the Chicago-based merger consultant, sums up third quarter and nine months merger activity so far in 1982.

In the third quarter of this year, net merger and acquisition announcements numbered 574. In third quarter 1981, they were 623.

Through the first nine months of this year, they were down 2 pct to 1,772 transactions from the year-earlier total of 1,807.

For the first three quarters, says Grimm, completed or pending transactions with a purchase price of $100 million or more totaled 88, a decline from the 94 registered in the similar 1981 period.

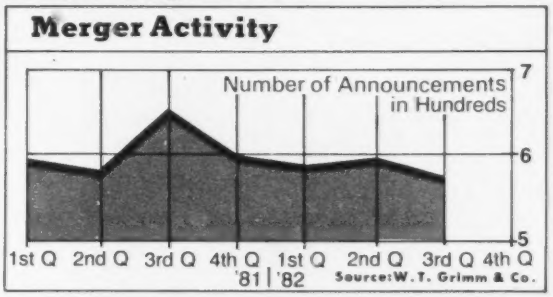
Willard T. Grimm, the company's chairman, noted the 1982 nine-month tally represented the first decrease in "big deals" since 1975. Billion-dollar deals dropped from eight transactions to six.

And due to the decline in "big deals," the total dollar value paid for all transactions (where a purchase price was given) went down to $42.3 billion in the first nine months of 1982. Third quarter last year was a record breaking $60.8 billion.

The biggest merger involving metalworking in the first nine months this year was Allied Corp.'s pending takeover of Bendix Corp.

But while the sizable dollar value deals are going down, the rate of sizable divestitures continues to climb.

Divestitures with price tags of $100 million or more have grown from seven in the first three quarters of 1978 to a present nine-month aggregate of 27.



Says Mr. Grimm, "With an emphasis on streamlining operations and strengthening balance sheets, corporate managements are divesting certain units so that they can concentrate their resources on the most productive areas and/or raise cash for debt reduction.

"Many corporations have earmarked both unprofitable divisions and profitable subsidiaries for divestment. A number of these transactions have taken the form of leveraged buy-outs in which management of the operating divisions become dominant equity participants with the assistance of professional merger consultants."

He notes that overall divestiture activity accounted for 654 or 37 pct of all transactions for the first nine months of 1982.

That is below the 620 or 34 pct in the comparable year-earlier period.

Ms. Tomislava Simic, Grimm's director of research, says the strength of the U.S. dollar has curbed the influx of foreign acquirers and at the same time may have acted as an added incentive for American purchases of foreign companies.

Top executives get raises, but bring home less money

Base pay for top executives of medium-sized firms increased in 1981. But, according to a recent survey, overall compensation actually declined.

The Peat, Marwick, Mitchell & Co. survey showed that salary plus bonus for the top officers increased at the rate of inflation, but total pay decreased by 9.5 pct because of losses in company stocks.

Division President: Levels of Pay

	Salary Plus Bonus		Capital Accumulation*	
	1981 Pay	Change 1980-81	1981	Change 1980-81
Steel	$105,000	$12,000	$22,000	$22,000
Metal Products	112,000	(12,000)	(17,000)	(54,000)
Machinery	107,000	3,000	28,000	22,000
Computers	125,000	6,000	(17,000)	(36,000)
Diversified Mfrs.	131,000	(5,000)	28,000	26,000

*Value at fiscal year end. *Note:* Figures in parentheses indicate a loss. Source: Peat, Marwick, Mitchell & Co.

The international accounting firm reports that long-term compensation, or capital accumulation, declined 70 pct reflecting the slow-moving stock market. Modest increases in base salary and cash incentives were more than offset by the decline in shares and options held by executives.

The survey notes that executives in medium-sized oil companies fared the worst, while top officers in steel and machinery companies increased their base income and their capital accumulation last year. The entire sample included 251 companies in 12 industries in the *Fortune* Second 500 list of companies.

The report notes that pay for executives increasingly is being tied to performance. "A decade marked by a weak economy and increasing international competition has changed the orientation of personnel policies from paternalism to productivity," says Peter Chingos, executive compensation partner.

More than two-thirds of the companies surveyed said they use some type of annual bonus plan. Most are based on either pre-determined goals and targets, or formulas. Mr. Chingos suggests that "companies are paying for the achievement of three-to-five year business objectives as well as for the achievement of their annual budgets."

METALWORKING ORDER TRENDS

The orders light stays on red—no shift yet to yellow

Lackluster

That's the label for metalworking new orders in September.

And that has been the label on orders since way back in July of 1981. Since that month, new orders for durable goods fell by 17 pct. Remove the inflation factor, and the 14-month decline comes out to about 25 pct.

There are still no signs of an end to the slide, let alone a turnaround. It seems the best that can be hoped for is a few months of a plateau in orders. That could indicate a springboard was being built that might finally catapult orders upward on a recovery spiral.

As one machine tool industry executive put it recently, "A turn-up in orders? Heck, I'm just looking for a *floor.*"

Durable goods new orders in September declined by 0.1 pct, or $0.1 billion from August. This was the fifth decline over the past six months. Metalworking industry products account for almost 90 pct of total durable orders.

The drag on orders in September was centered in the transportation equipment and primary metals industries. Transportation equipment was down $1.7 billion, or 10.3 pct, to $14.4 billion. Aircraft and aircraft parts and motor vehicles and auto parts led the decline.

And it was continued softness in the steel industry that put primary metals orders on the skids in September. The orders dollar volume decline in steel was 9.6 pct.

If there was any slim ray of hope or promise in the September orders data, it came from a slight gain in orders for machinery, both nonelectrical and electrical. Orders for nonelectrical machinery rose by 6.6 pct, or $0.8 billion; orders for electrical machinery rose by 4.4 pct, or $0.5 billion. These orders in recent months have gone up on a monthly basis only to tumble in subsequent months.

Another spot where some future turnaround strength might be seen was actually in an orders dip. In September, orders for defense industry capital goods fell by $1.1 billion, or 20 pct, to $4.2 billion.

In view of upcoming Pentagon releases of big-dollar contracts, new orders should start flowing to producers of capital war goods. That would be a sharp turn-up from current low levels.

Despite some promising signs in September, inventories, that leading indicator of orders, fell for the third straight month.

Billions of dollars, seasonally adjusted monthly total, unless otherwise noted		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
Capital Expenditures (Annual Rates)				
U.S. Industry, Total	4th Qtr.	$324.5*	$320.2	$327.8
Manufacturing, Total	4th Qtr.	122.9*	123.1	126.9
Manufacturing, Durable Goods	4th Qtr.	58.8*	60.0	60.8
Mining Industry	4th Qtr.	16.2*	15.7	16.8
Key Indicators, Durable Goods Manufacturing				
New Orders	Sept.	72.9	73.0	84.5
Shipments	Sept.	76.2	77.2	84.7
Inventories	Sept.	182.8	183.6	187.7
Unfilled Orders	Sept.	286.7	290.0	316.8
New Orders, Metalworking				
Capital Goods Producers, Nondefense Industries	Sept.	19.8	18.9	24.3
Capital Goods Producers, Defense Industries	Sept.	4.2	5.3	5.9
Primary Metals, Total	Sept.	7.9	8.2	11.1
Steel (SIC 331)	Sept.	3.4	3.7	5.7
Iron & Steel Castings (SIC 332)	Sept.	.6	.7	1.0
Nonferrous Metals	Sept.	3.9	3.8	4.4
Nonelectrical Mach.-Equip. Industrial, Total	Sept.	13.9	13.1	17.6
Engines & Turbines	Sept.	.9	1.1	1.5
Farm Machinery & Equipment (Shipments)	Sept.	1.0	.8	1.5
Construction, Mining & Materials Hdlg. Equip.	Sept.	2.6	2.2	3.2
General Industrial Machinery	Sept.	1.2	1.0	1.4
Fluid Power Equipment** (Index-1972=100)	Sept.	163	163	293
Metalworking Machinery	Sept.	.6	.7	.8
Machine Tools, Total (Millions $, unadjusted)***	Sept.	86.8	86.5	187.3
Machine Tools, Metal-Cutting***	Sept.	52.4	60.4	151.0
Machine Tools, Metal-Forming***	Sept.	34.4	26.1	36.3
Electrical Mach. & Equip. Industries, Total	Sept.	12.1	11.6	12.5
Elec. Transmission Equip. & Industrial Apparatus	Sept.	1.6	1.5	1.9
Household Appliances	Sept.	1.1	1.1	1.1
Communication Equipment	Sept.	4.3	4.3	4.2
Transportation Equip. Industrial, Total	Sept.	14.4	16.1	17.2
Motor Vehicles & Parts (Shipments)	Sept.	9.5	11.0	9.9
Aircraft, Missiles & Parts	Sept.	3.8	5.2	6.2
Shipbuilding & Military Tanks	Sept.	0.4	0.1	.6
Fabricated Metal Products, Total	Sept.	8.8	8.9	10.0
Instruments, Total	Sept.	4.1	3.9	4.0

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA.

WILL TURNKEY CAD/CAM SYSTEMS REMAIN VIABLE?

As CAD/CAM users more clearly define their goals for integration, what types of systems will they find to satisfy these new demands?

By Alice M. Greene

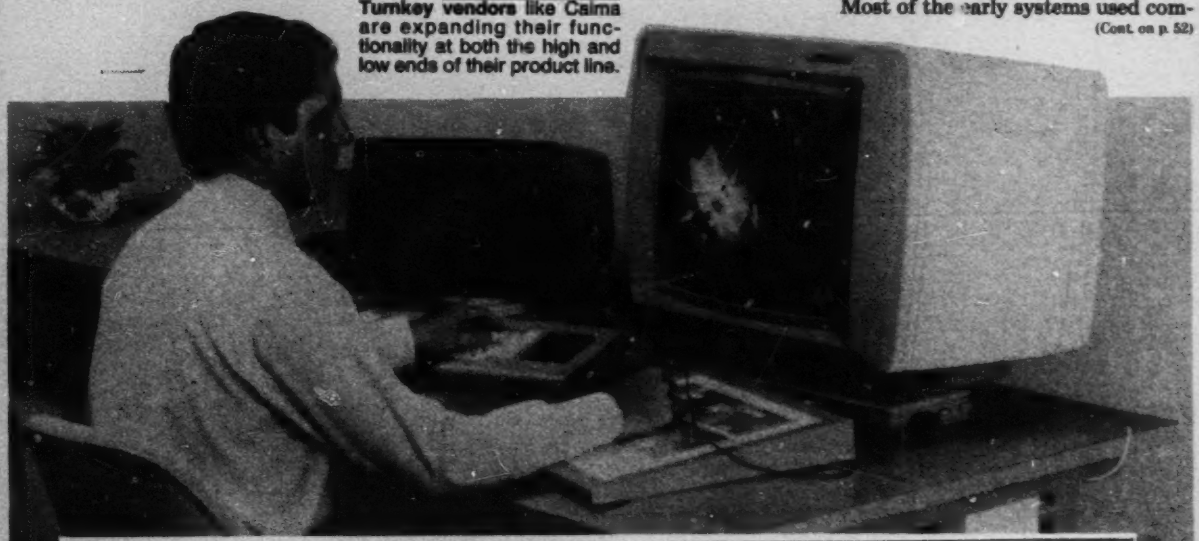
CAD/CAM (computer aided design and computer aided manufacturing) has emerged in the past decade from a curiosity to one of the key technologies in the re-industrialization of the United States. With a growth rate averaging 35 pct per year or perhaps better, the market for the computer graphics industry is projected to reach $10 billion by 1987.

Over the past ten years, the nature of the systems offered has changed to satisfy the changing needs of users. The scope of systems available today gives a customer a wide choice in terms of both systems size and support. It may, in fact, confuse the customer a little, as similar claims are made by proponents of very different systems.

The mainstay of early CAD/CAM business was the turnkey system. Turnkey vendors sold hardware, software, support, training, service. These vendors gave the business public the chance to see the gains in productivity and profitability that could be accomplished by using modern computer graphics technology.

Most of the early systems used com-

(Cont. on p. 52)



Turnkey vendors like Calma are expanding their functionality at both the high and low ends of their product line.

Estimated CAD/CAM Market Shares

	1979	%	1980	%	1981	%	1982 Est.	%
Computervision	$103	31	$191	34	$276	34	$355	33
IBM	40	12	71	13	130	16	180	17
Applicon	43	13	68	12	96	12	125	12
Calma	48	14	62	11	90	11	117	11
Intergraph	30	9	56	10	84	10	122	11
Auto-trol Technology	33	10	51	9	33	5	33	3
Gerber	12	4	14	2	17	2	19	2
McAuto (McDonnell Doug.)	4	1	7	1	12	1	16	2
Other	21	6	45	8	77	9	93	9
	$334	100%	$565	100%	$815	100%	$1060	100%

Source: Merrill Lynch, CAD/CAM Review, 1981

Sperry Univac offers the convenience of one vendor for all information processing needs. CAD/CAM meshes easily with manufacturing management programs.

(Cont. from p. 49)

puter systems which best answered their needs at that time. They used 16-bit computers—good computers which handled design problems, could tackle numerical control, in short, they were state of the art for this type of application.

Naturally enough, some of the turnkey vendors gained more experience in some applications than others, and vendors developed a "personality." Some were mechanical, some were electronic, etc.

Productivity gains reported by early users were valid. Improvements of 3:1 or 4:1 in design time were commonplace.

At the same time as these turnkey systems were developing, several large user organizations, airframe manufacturers and automotive companies were developing their own CAD/CAM systems privately. Their needs were unique in terms of complexity and precision required. The systems developed were developed on the computer systems which suited these organizations. They used large mainframe computers for the most part.

Things have changed a bit.

Almost the entire industrial community has become aware of the advantages of integrating manufacturing systems within a facility. This encompasses integrating design and manufacturing, business planning and production planning, product design and capacity planning.

No area can exist as a separate entity today as efficiently as it could if its operation, goals, material needs, personnel availability were integrated, were considered as inter-related factors adding up to a whole business operation. Business and technology; engineering and design; management and factory floor—all contribute to a business enterprise; all have information systems which can contribute more to the whole if they communicate.

This trend has changed the CAD/CAM industry. Users who gained experience with earlier turnkey systems, see this technology as a vehicle for integrating their operations, and these users want more capability from the systems they have. The turnkey vendors have responded to these demands by increasing the scope and the horsepower of their systems.

Users who licensed the software developed by the large airframe companies have grown in number. Their path to integration is facilitated by the data base management capabilities of the large mainframe computer systems in which the software resides.

At this point, although potential customers can achieve success either by investing in an enhanced turnkey CAD/CAM system or by acquiring CAD/CAM software to run on their mainframe computer, the ultimate 'best choice' is not fixed. Maybe it depends on the size of the company, maybe on that company's goals.

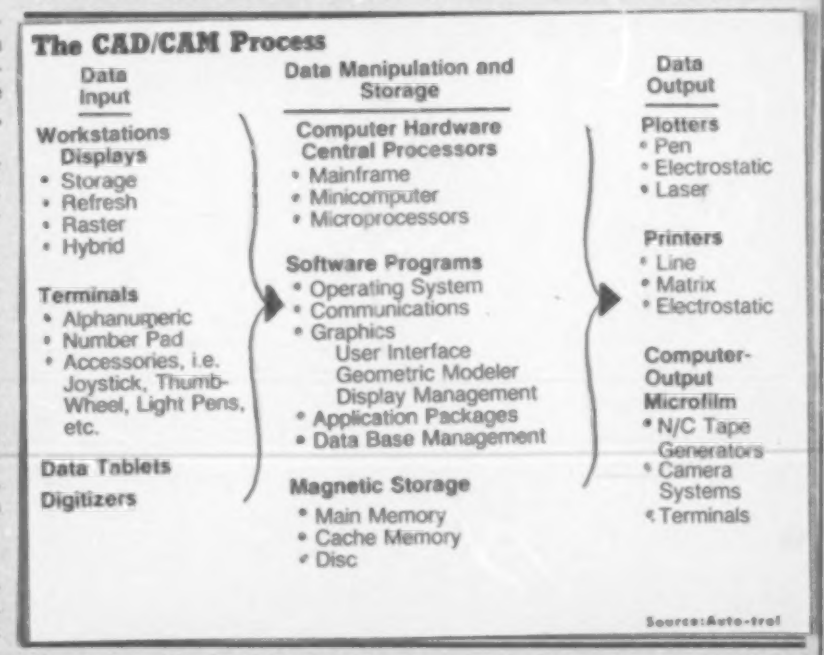
There are many opinions, but the spectrum of choice is too broad for generalization. The facts seem to say that the application of CAD/CAM, at whatever level a company is capable, will bring results—the extent of those results depends on the wisdom of the company, and its wisdom in applying computer aided technology as well as in its choice of CAD/CAM system.

There exist at the present time, three major groupings of CAD/CAM systems. The first is the low-cost stand-alone system. These systems range in price at or below $100,000. These systems are ideal for some users who will never need anything much bigger—architects, the education sector, some printed circuit board design and small mechanical design applications.

Then, there are systems with multiple stations that operate together. These cluster-type systems cost in the range of $400,000 for four stations and suit the needs of a medium size company with fairly complex design problems.

The third group of CAD/CAM systems or trends in the CAD/CAM industry is for large, complex systems which are capable of handling the design and manufacturing needs of a user and of integrating these activities with other information processing systems the user has or plans.

This integration can be accomplished through the newer turnkey systems which network multiple CPUs (central processing units) together to provide a more powerful computing re-



source and which also provide the ability to interface with any corporate computer environment.

Integration can also be accomplished by starting at the corporate computer, adding CAD/CAM software and graphics capability and building an in-house system. A number of mainframe computer manufacturers offer this approach with software either developed by that company or acquired.

IBM is, of course the most notable of the mainframe companies. Its market share in CAD/CAM has increased dramatically in the past few years.

IBM offers CADAM (Computer-Graphics Augmented Design and Manufacturing) a software package developed and used by The Lockheed Corp. over the past decade. CADAM is a two-dimensional system primarily for mechanical design.

IBM also provides three-dimensional capability through a software system developed by Dassault Systemes of Paris, called CATIA (Computer-Graphics Aided Three-Dimensional Interactive Application).

Most of all, IBM offers IBM with its image for support and service and its reputation for managing huge corporate data needs.

A proponent of the large computer resource for the successful application of CAD/CAM is Richard N. Spann, president of Adage, Inc. Adage manufactures high-quality computer graphics terminals and systems.

"I see a trend toward component selection between now and 1990," says Dr. Spann. "The graphics business is going to turn into a commodity business. Users are going to be able to buy software and hardware and buy it independently.

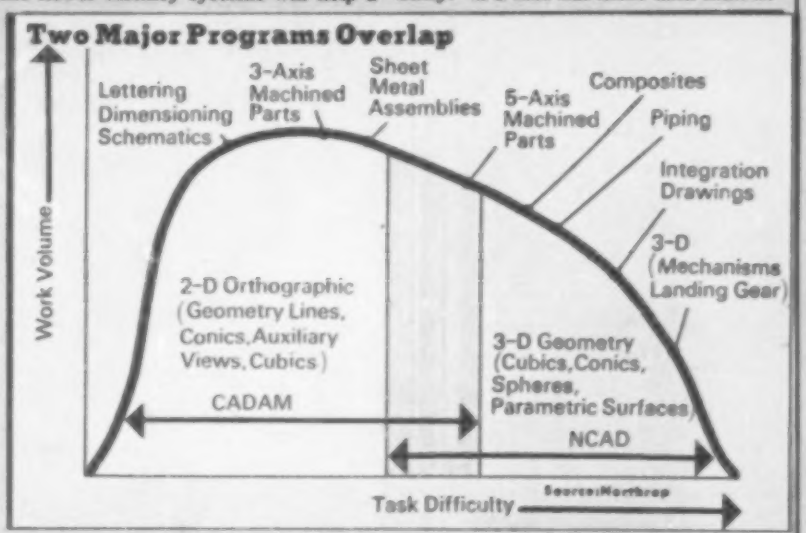
"We are going to see users buying constituent components of graphics as they enter their second generation of utilization, as they start pushing further toward the manufacturing end of CAD/CAM," he adds.

The gap between design and manufacturing has not been bridged yet, believes Dr. Spann. And it is unlikely that any one vendor can get its hands around a company's internal processes, design constraints, manufacturing techniques, documentation philosophies.

"Somehow that company is going to have to pick and choose components that come closest to meeting its requirements—software components and a hardware home for the software. Nobody is going to have good CAD/CAM unless they have well thought-out data base understanding. To manufacture a part you have to have more than a description of the part, you have to have a description of the manufacturing process.

"Complete CAD/CAM is going to require lots of rethinking in data bases. And corporate-wide data bases don't live in little machines, they need big mainframes," Dr. Spann adds.

On the other side of the coin, are the turnkey vendors who feel that their approach is the best way for a company to reap the benefits of CAD/CAM and that the concepts being incorporated in the newer turnkey systems will help a user company in his integration of CAD and CAM.



"Building your own CAD/CAM system will always result in more money being spent over the life cycle of the investment and hardly ever result in a better CAD/CAM product," says Matthew Peterson, manager of Software Technology Products, Strategic Marketing Group, Computervision.

One of the important challenges for turnkey vendors is to interact with the user company's corporate information environment. "Every customer that we see has already automated some part of his process of bringing a product to the marketplace somewhere in his corporation on some other computer. Turnkey CAD/CAM systems have to be sensitive to that and have ways of communicating and exchanging data with those other systems," adds Mr. Peterson.

Computervision feels it is the responsibility of the turnkey vendor to make it easy for users to imbed CAD/CAM systems into some larger corporate information scheme. That includes providing hardware links, communications protocols to talk to other computers, all the way to supporting industry-neutral data base exchange standards.

In terms of managing a user company's corporate data base, Mr. Peterson says that there are some functions of data management that large mainframes are excellent at handling. For on-line archiving, it's hard to beat IBM machines. They support massive numbers of discs, huge mass storage systems, and automated tape libraries.

The emphasis in one of CV's current product developments is a software package that will exploit IBM's capability. "If a user has more data than he can store in his Computervision system, data that he wants on-line, but not necessary local, this package will allow that user to store the data on-line in the IBM system. Yet the data can be retrieved by the CV system. That's one example of turnkey systems making use of other computing resources," notes Mr. Peterson.

"On the other hand, the management of graphics data bases is something extremely specialized, which the larger computers are ill-suited to," he says.

Using the different systems to do what they do best gives the user the best solution. And having the turnkey vendor supply this solution saves time and money for the user.

One of the interesting aspects of this dynamic industry is that all of the suppliers, hardware suppliers, software suppliers, systems suppliers all see the same trends and have the same goal—for the high end of their market—CAD/CAM systems of varying complexities, distributed throughout a user organization, linked together and linked in some fashion to larger corporate systems for more thorough integration. Each sees

(Cont. on p. 56)

(Cont. from p. 53)

the same goal, but the approaches differ.

Sperry Univac, for example, has taken a third approach. the company does not provide a turnkey solution to CAD/CAM. Yet it has developed its own CAD/CAM software. It system runs on the company's 1100 series mainframe computers linked to its V77 minicomputers in a distributed processing configuration.

The strength of this approach, according to Jack Murphy, director, Manufacturing Industry Center, for Sperry Univac, is the integration of the various subsystems, design, drafting, numerical control, engineering analysis. Subsystems may run on the mainframe, as does analysis, or on the mini, as does design. The graphics terminals which are either from Adage or Megatek further distribute the processing power of the system.

Downloading a lot of the CAD/CAM operations to the minicomputer frees the mainframe to run other business programs, not the least of which is UNIS (Univac Industrial System), a modular solution to manufacturing control including MRP, Bill of Materials, etc.

"The UNIS*CAD system also allows integration with business systems such as the UNIS programs and with shop floor management systems as well. Once you have captured the geometry of a part, you can tie it into the manufacturing control system directly," says Mr. Murphy.

With its unique approach, Univac competes with both the turnkey systems and its brother mainframe computer companies. It gives a user one source for most of his information needs, technical and business. And since all the software used was designed to work together, interfacing between systems is smoother and simpler.

Perhaps in the process of seeking integrated solutions, all vendors, mainframe and turnkey are redefining their roles. Some of the support vendors like Sperry Univac are providing are almost as all-encompassing as turnkey. And, turnkey vendors are changing at the same time. Turnkey can be a networked system today, which goes beyond the scope of the original definition.

Turnkey vendors are adding hardware and software to satisfy their customers. Computervision has added a 32-bit computer for analysis to its network scheme. It has developed links to coordinate measuring machines and robots which have been displayed at the International Machine Tool Show.

Calma will shortly introduce a new system addressing the networking/distributed processing approach to CAD/CAM, according to Leif Rosqvist, vice president, Marketing for Calma.

Calma introduced a new low-cost system at the International Machine Tool Show. With the forthcoming announcement, the company will reassert its intention to remain a market leader.

Mr. Rosqvist feels the real strength of the turnkey companies is that they have the dedicated knowledge of CAD/CAM and that they are in the business of supplying systems, not computers.

"The value of the turnkey business," says E. Joseph Zemke, executive vice president, Auto-trol Technology Corp. is that it takes a fairly defined set of problems, like computer-aided design, manufacturing and engineering, and it provides a solution to those problems in terms of hardware, software, education and training and expertise. The solution, usually provides the user company with a pretty good return on the investment. The approach suited the early CAD industry, because it was a new business and people didn't understand it very well. What that led to was very highly specialized hardware and software. It was very difficult to tie these systems into the rest of a business and most people didn't try," explains Mr. Zemke.

Now, as we have mentioned, computer aided design and manufacturing has been accepted and users want more from those systems, both in terms of that system's CAD/CAM solution and in terms of communicating to other computers in other plant areas.

Not only that, but sophisticated users no longer want to dedicate a special-purpose hardware resource to that function, says Mr. Zemke. Users may want electronic mail, word processing, other types of programs. And they want to use the same hardware to deliver those programs.

"In other words, don't give us a tool that only does CAD/CAM," he says. Auto-trol is responding to this shift in demand, by changing its philosophy to "opening up its system" to provide a CAD/CAM solution that will co-exist with other kinds of problem-solving tools.

"The graphics systems we ship today run on absolutely standard hardware and software. When a customer buys our VAX-based system, for example, he knows that any other program that runs on a VAX will run and co-exist with ours. He can share that resource in a much more comprehensive way," notes the Auto-trol executive.

"We also provide windows in and out of our CAD/CAM system, so that a customer programmer can, using a high level language, has access to all the facilities of the graphics system. He can extend the usage of it, and tie it into other parts of his business.

"A third aspect of change that we address is that, as you start to provide a computer at every workstation, such as Auto-trol's new line, you can dedicate that workstation to CAD/CAM. Or you can carry over the same philosophy we have used in the centralized system. Now the workstation can also have a broader role and can begin to satisfy a need for a more general purpose engineering/design workstation that goes beyond just graphics," he concludes.

This approach fulfills the traditional need of the turnkey system for a solution to a problem, and at the same time frees the computer resource to fill an additional role in the company information environment. □

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Other articles in this series in 1981:

Are PC Systems The Answer to Factory Automation, Oct. 26, pp. 44-48

Software: Making It Less Costly and More Available, Nov. 23, pp. 76-90

CAD/CAM Systems Explode in Metalworking, Dec. 28, pp. 48-51

In 1982:

Training the Next Generation of Manufacturers, Jan. 22, pp. 62-65

Data Communications: Vital Link in a Manufacturing System, Feb. 19, pp. 75-79

Robots Extend a Helping Hand, March 19, pp. 59-83

PCs Provide Shop Floor Control With Boardroom Impact, April 23, pp. 94-96

Speech Technology: The Voice of Tomorrow's Factories? May 21, pp. 92-97

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Is It Time for a New Approach to NC Programming?, Sept. 24, pp. 83-89

Are Factory Systems the Path to Productivity?, Oct. 22, pp. 41-48

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EFFECTIVE NOVEMBER 1, 1982

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	141	116	159	234
Buffalo	30	30	29	57
Pittsburgh	115	137	134	315
Youngstown	50	67	72	127
Cleveland	83	95	99	159
Detroit	96	103	95	141
Chicago	337	333	341	513
Cincinnati	69	64	68	96
St. Louis	52	55	54	87
Southern	68	61	73	213
Western	48	50	59	128
U.S. Production	1,089	1,111	1,183	2,070

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer..... gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective November 1, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	1,089	1,111	63,262	103,407
Capability Utilization Rate	36.8	37.6	49.5	80.7

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$203.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 51.50	$ 52.17	$ 53.50	$ 80.17
No. 2 bundles	$ 38.83	$ 39.17	$ 39.50	$ 56.50

Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 52.50	$ 54.50	$ 55.50	$90.50
No. 1 steel, Philadelphia	55.50	55.50	58.50	68.50
No. 1 steel, Chicago	46.50	46.50	46.50	81.50
No. 1 bundles, Detroit	41.50	44.50	47.50	83.50
Low Phos., Youngstown	52.50	56.50	58.50	95.50
No. 1 mach'y cast., Pgh	64.50	64.50	66.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	114.50
No. 1 mach'y cast., Chi.	103.50	103.50	103.50	120.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective November 1, 1982)
Prices obtained in trade based on representative tonneges per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	72.00	71.00-72.00	10/19/82
Lead	23.00-26.00	23.00-29.00	10/22/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00-42.00	41.00-42.00	10/5/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.35-$1.45
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $427.25
Indium, dollars per troy oz..... $2.85-$4.00
Iridium, dollars per troy oz..... $500
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$365-$385
Molybdenum, lb. tech. moly oxides, 20 lb. MO can ..... $6.85-$8.50
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $10.27
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Oct. 25—558.15
Oct. 26—558.41
Oct. 27—559.07
Oct. 28—561.99
Oct. 29—521.85

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	67½	58¼
Yellow brass	59¼	54⅛
Red brass	63	56½
Comm. bronze	64	57
Mang. bronze	58⅞	57⅛
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	56
No. 2 copper wire	50
Light copper	41

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	52
No. 2 copper wire	46
Light copper	37
No. 1 composition	52
No. 1 comp. turnings	47
Hvy. yellow brass solids	34
Hvy. yellow brass turnings	25
Radiators	41

Aluminum

New mixed clips	24	—25
Old sheet	23	—24
Old cast	23	—24
Clean dry borings	24	—25

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	23	—24
Mixed L.C. clips	21	—22
Old sheets and cast	15	—16
Borings and turnings	12	—13
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	44	—45
No. 2 copper wire	37	—38
Light copper	32	—33
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	24	—25
Brass Pipe	28	—29
New soft brass clippings	36	—37

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	20	—21

Nickel

Nickel solids	115	—120
Nickel rod ends	115	—120
Nickel sheets, clips	115	—120
Nickel turnings	55	— 60

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

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EFFECTIVE NOVEMBER 1, 1982

MATERIALS NEWSFRONT

(Effective November 1, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	45.00 to	46.00
No. 1 dealer bundles	63.00 to	64.00
No. 1 factory bundles (auto)	60.00 to	61.00
No. 2 bundles	38.00 to	39.00
No. 1 busheling	61.00 to	62.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	67.00 to	68.00
Heavy turnings	45.00 to	46.00
No. 1 RR hvy. melting	65.00 to	66.00
Rails 2 ft. and under	80.00 to	81.00
Scrap rails, random lgth.	78.00 to	79.00
RR specialties	71.00 to	72.00
No. 1 machinery cast	64.00 to	65.00
Cupola cast	57.00 to	58.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	490.00 to	500.00
18-8 turnings	390.00 to	400.00

Chicago

No. 1 hvy. melting	$ 46.00 to	$ 47.00
No. 2 hvy. melting	42.00 to	43.00
No. 1 dealer bundles	56.00 to	57.00
No. 1 factory bundles (auto)	59.00 to	60.00
No. 2 dealer bundles	38.00 to	39.00
No. 1 busheling	57.00 to	58.00
Shredder scrap	56.00 to	57.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	33.00 to	34.00
Low phos. forge crop	77.00 to	78.00
Low phos. punchings plate ¼ in. and heavier	81.00 to	82.00
Low phos. 2 ft. and under	76.00 to	77.00
No. 1 RR hvy. melting	49.00 to	50.00
Scrap rails, random lgth.	51.00 to	52.00
Reroller rails	85.00 to	86.00
Rails, 2 ft. and under	77.00 to	78.00
RR couplers and knuckles	70.00 to	71.00
RR car axles	102.00 to	103.00
No. 1 machinery cast	103.00 to	104.00
Cupola cast	89.00 to	90.00
Stove plate	76.00 to	77.00
Steel car wheels	61.00 to	62.00
Stainless		
18-8 bundles and solids	450.00 to	460.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	95.00 to	100.00
430 turnings	65.00 to	70.00

Philadelphia

No. 1 hvy. melting	$ 54.00 to	$ 57.00
No. 2 hvy. melting	48.00 to	51.00
No. 1 dealer bundles	65.00 to	68.00
No. 2 dealer bundles	38.00 to	41.00
No. 1 busheling	65.00 to	68.00
Shredder scrap	71.00 to	74.00
Machine shop turn.	18.00 to	21.00
Mixed bor. and turn.	18.00 to	21.00
Shoveling turnings	30.00 to	33.00
Clean cast chemical borings	40.00 to	43.00
Low phos. 5 ft. and under	60.00 to	63.00
Low phos. 2 ft. punchings	85.00 to	88.00
Electric furnace bundles	75.00 to	78.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	89.00 to	92.00
Cupola cast	53.00 to	56.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 36.00 to	$ 37.00
No. 2 hvy. melting	34.00 to	35.00
No. 1 dealer bundles	41.00 to	42.00
No. 2 bundles	18.00 to	19.00
No. 1 busheling	40.00 to	41.00
Drop forge flashings	21.00 to	22.00
Machine shop turn.	14.00 to	15.00
Mixed borings and turn.	7.00 to	8.00
Shoveling turnings	14.00 to	15.00
Cast iron borings	5.00 to	6.00
Heavy breakable cast	24.00 to	25.00
Mixed cupola cast	40.00 to	41.00
Automobile cast	58.00 to	59.00
Stainless		
18-8 bundles and solids	395.00 to	405.00
18-8 turnings	285.00 to	295.00
430 bundles and solids	70.00 to	80.00

Youngstown

No. 1 hvy. melting	$ 45.00 to	$ 46.00
No. 2 hvy. melting	30.00 to	31.00
No. 1 dealer bundles	51.00 to	52.00
No. 2 dealer bundles	30.00 to	31.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	8.00 to	9.00
Low phos. plate	52.00 to	53.00
Electric furnace bundles	52.00 to	53.00
Galvanized bundles	42.00 to	43.00

Cleveland

No. 1 hvy. melting	$ 42.00 to	$ 43.00
No. 2 hvy. melting	28.00 to	29.00
No. 1 dealer bundles	51.00 to	52.00
No. 1 factory bundles	51.00 to	52.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	53.00 to	54.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	72.00 to	73.00
Low phos. punchings plate	72.00 to	73.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	62.00 to	63.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	82.00 to	83.00
Rails, 18 in. and under	83.00 to	84.00
Steel axle turnings	69.00 to	70.00
Railroad cast	87.00 to	88.00
No. 1 machinery cast	87.00 to	88.00
Cupola cast	87.00 to	88.00
Stove plate	60.00 to	61.00
Stainless		
18-8 bundles	375.00 to	385.00
18-8 turnings	295.00 to	305.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 25.00 to	$ 26.00
No. 2 hvy. melting	15.00 to	16.00
No. 1 busheling	32.00 to	33.00
No. 1 dealer bundles	30.00 to	31.00
No. 2 bundles	12.00 to	13.00
Machine shop turn.	1.00 to	2.00
Mixed bor. and turn.	8.00 to	9.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Low phos. plate	52.00 to	53.00
Structural and plate, 2 ft. and under	50.00 to	51.00
Rails, 2 ft. and under	42.00 to	43.00
Scrap rails, random lgth.	22.00 to	23.00
No. 1 machinery cast	65.00 to	66.00
No. 1 cupola cast	44.00 to	45.00

St. Louis

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	42.00 to	43.00
Foundry steel, 2 ft.	42.00 to	43.00
No. 1 dealer bundles	50.00 to	51.00
No. 2 bundles	39.00 to	40.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	50.00 to	51.00
Rails, random length	52.00 to	53.00
Rails, 18 in. and under	67.00 to	68.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 56.00 to	$ 57.00
No. 2 heavy melting	53.00 to	54.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	43.00 to	44.00
No. 1 busheling	54.00 to	55.00
Shredder scrap	72.00 to	73.00
Machine shop. turn.	20.00 to	21.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	52.00 to	53.00
Elec. furnace, 3 ft. & under	52.00 to	53.00
Structural and plate, 2 ft.	70.00 to	71.00
Structural and plate, 4 ft.	67.00 to	68.00
No. 1 RR hvy. melting	54.00 to	55.00
Scrap rails, random lgth.	59.00 to	60.00
Rails, 18 in. and under	74.00 to	75.00
Angles and splice bars	65.00 to	66.00
No. 1 cupola cast	75.00 to	77.00
Unstripped motor blocks	55.00 to	56.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 29.00 to	$ 30.00
No. 2 hvy. melting	27.00 to	28.00
No. 1 dealer bundles	30.00 to	31.00
No. 2 bundles	19.00 to	20.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	3.00 to	4.00
Cast iron borings	4.00 to	5.00
Low phos. 18 in. and under	56.00 to	57.00
Rails, random length	36.00 to	37.00
Rails, 2 ft. and under	63.00 to	64.00
No. 1 cupola cast	44.00 to	45.00
Heavy breakable cast	20.00 to	21.00
Drop broken cast	59.00 to	60.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to	$ 29.00
No. 2 hvy. melting	24.00 to	26.00
No. 2 dealer bundles	23.00 to	24.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	440.00 to	450.00
18-8 turnings	375.00 to	400.00
430 prepared solids	90.00 to	100.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to	$ 30.00
No. 2 hvy. melting	20.00 to	22.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 bundles	16.00 to	18.00
No. 1 busheling	28.00 to	30.00
Shredder scrap	38.00 to	40.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	2.00 to	4.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	23.00 to	25.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	27.00 to	29.00
No. 2 dealer bundles	12.00 to	14.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	84.00 to	86.00

Los Angeles

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	9.00 to	11.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	85.00 to	87.00
No. 1 cupola cast	87.00 to	89.00

Seattle

No. 1 hvy. melting	$ 54.00 to	$ 56.00
No. 2 hvy. melting	43.00 to	45.00
No. 2 bundles	33.00 to	35.00
No. 1 cupola cast	89.00 to	91.00
Mixed yard cast	79.00 to	81.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 33.00
No. 2 heavy melting cut 2 ft. and under	30.00
No. 1 dealer bundles	40.00
No. 2 bundles	5.00
Mixed steel scrap	17.00
Bush. new fact. prep'd.	38.00
Bush. new fact. unprp'd.	30.00
Machine shop turn.	18.00
Short steel turn.	21.00
Mixed bor. and turn.	10.00
Cast scrap	30.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	43.00 to	44.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	8.00 to	9.00
Crushed turnings	22.00 to	24.00
Shredder scrap	55.00 to	56.00
Cut structural plate 2 ft. and under	77.00 to	78.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	66.00

Chilton's

DECEMBER 6, 1982

IRON AGE

THE MAGAZINE FOR METAL PRODUCING MANAGEMENT

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THE WORLD STEEL COMMUNITY PUTS ITS HOUSE IN ORDER

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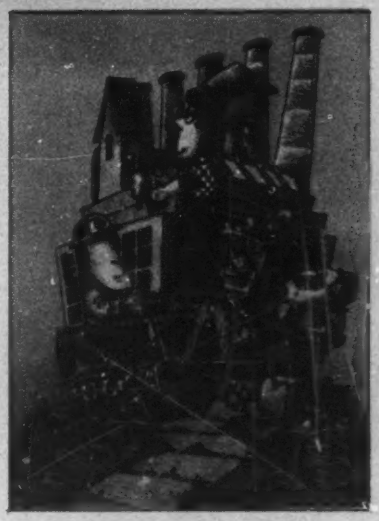
DECEMBER 6, 1982



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METALWORKING PRICE TRENDS

Recession continues to hold tight rein on prices

Price softness at the wholesale level continued in October. Only higher tags on 1983 model-year cars and trucks kept prices from actually dipping again as they did in September.

The Labor Dept.'s price index for producers' finished goods rose by 0.5 pct in October. In the month, prices of autos and trucks rose sharply and accounted for just about all the rise in the price index. (See table.) These soaring prices came about as higher-priced '83 models followed a month where motor vehicle prices were pushed down by end-of-the-year clearance sales.

Despite the October surge in auto-truck prices, the change in producers' finished goods prices from a year ago, came only to 3.6 pct. In October of last year, the 12-month price increase at that time came to 7.4 pct.

Prices for capital equipment in October moved up 0.2 pct. This followed a decline of 0.4 pct in September. Again, much of the latest-month price hike was due to the spurt of autos and trucks.

The only metalworking product line, aside from motor vehicles, that showed any unusual upward push in prices was agricultural machinery. In view of the current soft market demand for such equipment, it is difficult to see why these prices rose so strongly. Explanations from prices analysts and producers not only vary, but differ.

There was also price strength shown by oilfield and gasfield machinery in October. But here, a few sales of big, high-price equipment units was enough to give a kick to the price index. With relatively few sales being made, sales of a few upgrade units with hefty tags could account for all the price hike.

Just about every economic sign presently points to continued slow business activity in metalworking lines. That means prices will probably slide a bit over at least the next couple of months. In just about all producers' goods lines, it is a buyers' market that rules.

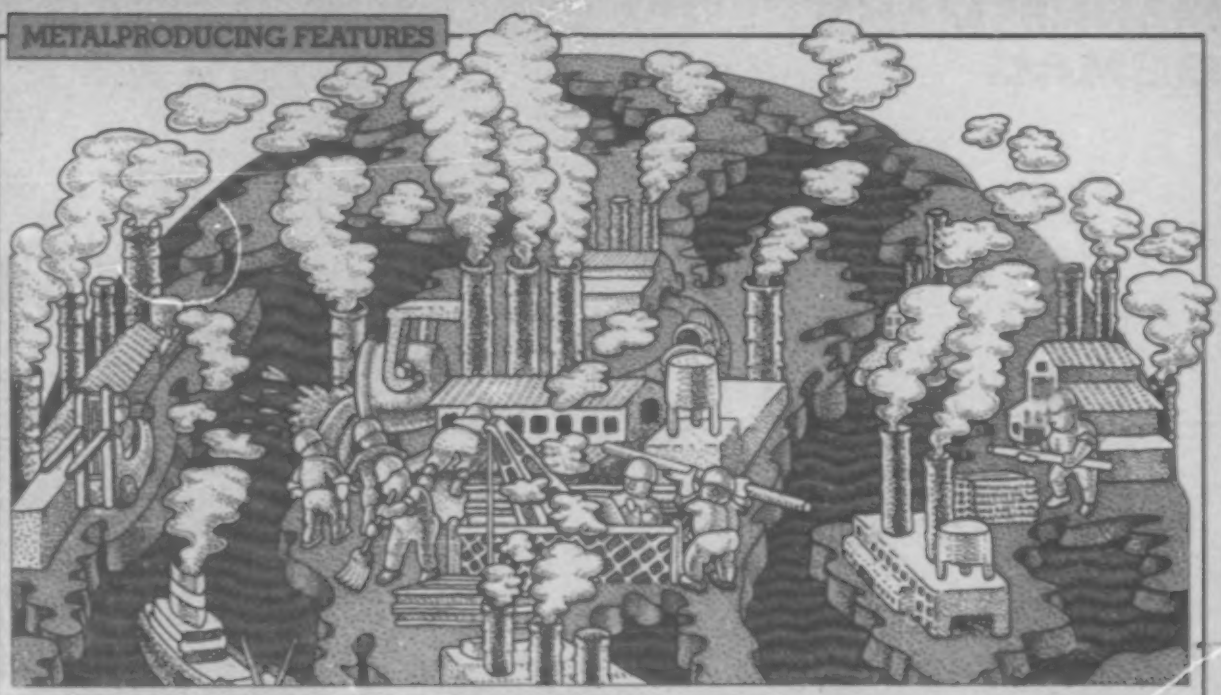
A real danger of this disinflation is the damage it can do to already-weak corporate earnings and liquidity. The adverse effect on companies could continue well into any recovery cycle.

It now looks like producer goods prices for 1982 will be up by about 3.5 to 3.9 pct from last year. This would be a big slide from the 71 pct rise scored in 1981. It would also be the smallest year-to-year increase since 1971.

Latest Month Covered: October, 1982

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	373.1	+ 0.3	+ 5.5
Metal Forming Machine Tools	410.8	+ 0.1	+ 6.1
Agricultural Machinery & Equip.	317.0	+ 1.1	+ 7.3
Construction Machinery & Equip.	346.6	− 0.3	+ 5.6
Industrial Process Furnace & Ovens	356.1	+ 0.3	+ 5.3
Industrial Material Handling Equip.	285.6	− 0.1	+ 0.6
Pumps, Compressors & Allied Equip.	347.8	− 0.1	+ 4.5
Fluid Power Equip. (Dec. 1970 = 100)	247.2	+ 0.5	+ 8.5
Mechanical Power Transmission Equip.	311.2	− 1.2	+ 3.4
Automobiles	219.6	+ 9.3	+ 2.6
Motor Trucks—Light	273.9	+ 6.7	+ 1.7
Motor Trucks—Heavy	317.5	+ 9.8	+ 7.6
Railroad Equipment	357.5	+ 0.8	+ 5.6
Fabricated Metal Structural Products	303.7	− 0.2	+ 0.4
Electric [illegible]	291.2	+ 0.1	+ 0.6
Valves & Fittings	322.5	− 0.2	+ 1.9
Ball & Roller Bearings	335.3	NC	+ 4.3
Cutting Tools & Accessories	271.9	+ 0.1	+ 3.9
Heating Equipment	238.7	− 0.3	+ 4.2
Plumbing Fixtures & Brass Fittings	277.8	+ 0.3	+ 1.8
Metal Containers	328.7	NC	+ 3.3
Miscellaneous Metal Products	289.7	+ 0.1	+ 4.9

Data based on U.S. Labor Dept.'s Producer Price Index



WORLD STEEL PRODUCERS PUT A TIGHT GRIP ON WORLD STEEL OUTPUT

With steel profits a global rarity, steelmakers are putting their houses in order to reduce the limit of steel flowing into the world market.

By George McManus at the International Iron and Steel Institute meeting in Tokyo, Japan.

World Steel producers are moving to put their houses in order.

There is a general effort to limit the quantity of steel flowing into the world market. The much talked-about contraction of steel capacity has started. In the United States, steel companies are seeking to moderate the wage escalation that has contributed to trade problems.

The magnitude of the steel adjustment is brought out by the cast of characters. President Reagan; Prime Minister Margaret Thatcher of Great Britain; Chancellor Helmut Kohl of West Germany: All have been involved in smoothing troubled steel waters.

U.S. Commerce Secretary Malcolm Baldrige is credited with herculean efforts in negotiations between the U.S. and Europe. The big breakthrough came when these talks produced a Common Market agreement to limit shipments of carbon and alloy steels to about 5 pct of the U.S. market.

Coming only a few hours before the U.S. was due to impose countervailing duties, the European pact is expected to trigger a chain reaction of similar restraints.

"Without perceiving trade issues on an international basis, we would merely transfer problems from one hemisphere to another," said David M. Roderick, chairman of United States Steel Corp.

The Japanese seem amenable to some form of voluntary restraint or quota. "That is almost what we are doing now," says Minoru Kaneo, president of Japan's Nippon Kokan.

Mr. Roderick indicated efforts would be made to bring Third World countries into line. The Reagan Administration was working on proposals for restricting imports of specialty steels. These were urgently needed to keep the carbon steel limits from bringing a transfer of tons and problems to specialty markets.

While the imposition of steel trade restraints seems a dramatic break with the past, the real change may not be that great. What is starting to emerge is a picture of quiet arrangements governing steel trade outside the U.S.

U. S. Steel charges that Japanese steel has been diverted to the U.S. by an agreement that limits Japan's steel shipments to Europe. According to U. S. Steel, this is just one of many such deals.

"We've uncovered a number of other bilateral agreements," says Mr. Roderick. This suggests the U.S. is now simply being plugged into the world network.

There have been past attempts to keep steel trade within bounds. Voluntary quotas were instituted in 1969 by European and Japanese producers. These depended on the foreign mills' good

(Cont. on p. MP-5)

(Cont. from p. MP-5)

will, which varied with market conditions. The voluntary restraints were dropped after 1974. The world boom had eased fears of oversupply. And U.S. courts had ruled that the restraints were illegal.

The newest attempt at restraint should be more successful. The agreement with Europe is an official, government thing. Steel shipments from Europe must be licensed. The Customs Bureau is directed by special legislation to deny admission to any unlicensed shipments of the covered products.

A second factor is that financial pressure is forcing companies and countries to deal with overcapacity. The problem of excess steel supply has long been recognized, but there has not been a general willingness to dispose of excess, obsolete facilities.

In 1982, it was not a question of willingness; the steel market was just not large enough to support the world steel establishment. As a result, steel companies were losing great gobs of money.

"My guess is that steel profit will be a global rarity if not actually extinct for calendar 1982," said Frederick G. Jaicks, chairman of Inland Steel Co. and also chairman of the International Iron & Steel Institute (IISI).

In the past, many governments were willing to bail out losing steel operations. This has been the big complaint of U.S. mills. Even in market economies, private companies could count on indirect help through economic stimulants.

In 1982, the governments, themselves, were going broke. Latin American countries have foreign debts totalling $250 billion. Of this, 75 percent is concentrated in steel-oriented nations: Mexico, Brazil, Argentina, and Venezuela.

In the United States, the prospect of a $100 billion deficit led the Reagan Administration to scale down tax provisions that would have lifted demand for steel and eventually helped generate steel capital.

Japan's $20 billion deficit has inhibited actions to stimulate that country's economy and steel market. "Given the size of Japan's fiscal deficit, there are limits to the kind of fiscal measures available to the government," said Haruo Mayekawa, governor of the Bank of Japan.

The financial squeeze has been reflected in capital deferments and plant shutdowns. Two big steel programs have been delayed by Venezuela. Armco Inc. has put its big seamless expansion on hold. Others are also applying the brakes.

"Certain non-essential spending programs have been postponed, stretched out or cancelled," says Mr. Roderick. Essential projects are going forward but at a slower pace, he says.

The most decisive capacity slash has been by British Steel Corp. "Manned capacity has been reduced from 23 million tons to 14.4 million tons," says David Grieves, managing director of personnel and social policy for British Steel. "Total manpower has been reduced from over 225,000 to around 90,000."

Britain's cutback began in 1977. That was the year Alan Wood Steel Co. went bankrupt and Youngstown Sheet & Tube Co. closed steel furnaces in the Youngstown area.

More recently, U. S. Steel has shut down its Youngstown steel works. The Midland, Pa., plant of Crucible Steel has been closed. Kaiser Steel Corp. has announced the end of iron making at Fontana, Calif. Bethlehem Steel Corp. is disposing of its West Coast mills.

"It's now estimated that, nationally, as much as 20 pct of U.S. domestic steelmaking capacity, or about 30 million tons, will be shut down within the next few years," says William J. Shields, president of Raritan River Steel Corp.

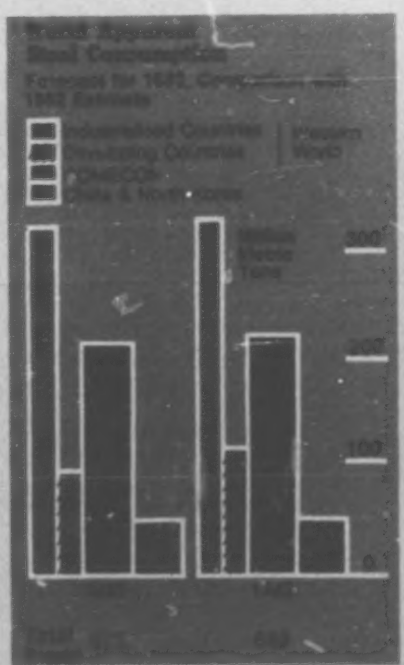
Underlying the recent cutbacks is a market situation that went from bad in 1980 and 1981 to awful in 1982. "This year promises to go down in the books as the worst within the memory of most senior steel executives," said Mr. Jaicks.

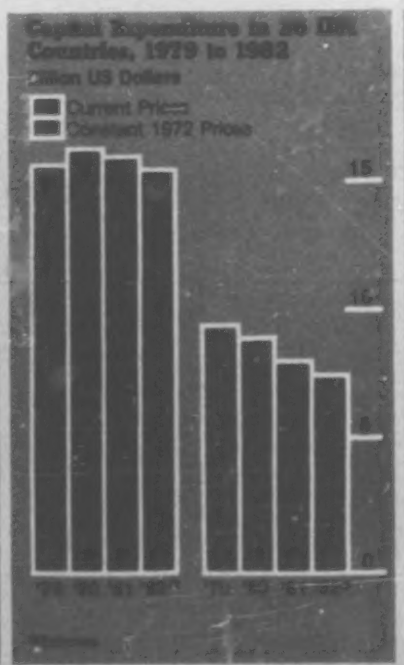
There was no argument on this point when steel leaders convened in Tokyo for the annual meeting of IISI. Yoshifumi Kumagai, president of Sumitomo Metal Industries, Ltd., referred to the "synchronized recession of the world economy."

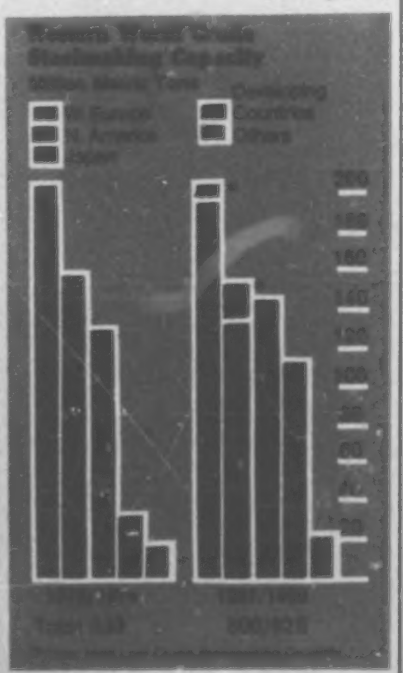
Mr. Kanao of Nippon Kokan said his company's operations were down close to 60 pct of capacity.

"The world economy in 1982 is probably facing the worst recession since the 1930's," Lenhard J. Holschuh, secretary general of IISI.

(Cont. on p. MP-11)







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(Cont. from p. MP-7)

Mr. Holschuh noted that Western World steel output was down 11 pct in the first eight months of 1982. He said things were getting steadily worse.

In his longer term projection, Mr. Holschuh held out little hope that steel problems would be solved booming demand. "The underlying trend growth rate will be around zero in the mature economies," he said. "For the next few years, there can be no question that existing capacity will be sufficient to cope with the rather slow growth in demand."

Hardest hit by the 1982 slump were American mills. Through August, raw steel output in the U.S. was down 38 pct from the first eight months of 1981. In the same period, Europe's steel output was down only 5 pct and Japan's production was up slightly.

American producers charge that foreign mills have maintained production by sending their surplus to the U.S. Through August, U.S. imports from the Common Market were up 3 pct and imports from Japan were down only 1 pct. Shipments of American mills to the U.S. market were down more than 30 pct.

"At one juncture earlier this year," said Mr. Jaicks, "steel imports into the U.S. soared to 26.2 pct of apparent consumption, while striking losses were being absorbed by domestic steel producers. No other Free World marketplace has been subjected to such a barrage nor could it have been."

Mr. Jaicks, who has ruffled foreign feathers at past IISI sessions, minced no words in assessing blame for trade problems. "Governments that subsidize their industrial sectors, and in the process upset world markets, make a travesty of true international competition."

Support for this charge came in a statement attributed to Willy Korf, whose Korf Industries operates steel plants in both the U.S. and Europe.

"The 70 pct of European steel companies that are dependent on the state have ceased to think and act in terms of free enterprise," said Mr. Korf. "They have come to regard themselves as employment agencies."

The trade issue began heating up in 1981 when U.S. demand lagged and imports surged. Steel imports rose from 15.5 million tons in 1980 to nearly 20 million tons in 1981. Ignoring the Trigger Price Mechanism, foreign steel producers captured more than 19 pct of the U.S. market.

The trigger system was officially abandoned on Jan. 11, 1982 when domestic mills filed dumping and countervailing duty suits against carbon steel producers in seven European countries plus Brazil and South Africa. The big target was Europe, which had boosted steel shipments to the U.S. more than 66 pct in 1981.

From the outset, there was talk that the real aim of domestic mills was some sort of quota. There was no great secret about this. Thomas C. Graham, president of Jones & Laughlin Steel Corp., said flatly that quantity restrictions were the only answer. Mr. Roderick of U. S. Steel repeatedly expressed a willingness to consider any effective alternative to the trade suits.

Domestic producers were well aware they faced an uphill struggle in seeking enforcement of the trade laws. The strengthening of the dollar made the most efficient European mills less vulnerable to price-based complaints. Even when currency rates were normal, domestic industries had had little success in securing the imposition of dumping and countervailing duties.

The steel companies didn't really have much choice. The Reagan Administration was dead set against unilateral quantity curbs.

"We would not engage in legislative proposals to establish a quota system," said Lionel Olmer, Undersecretary of Commerce for International Trade. "That is fundamentally contrary to the free trade philosophy of the Reagan Administration."

The Administration didn't want punitive duties either. Every other news story on the steel problem warned that

Why U.S. Steel Men Held Out for Tighter Controls

On Aug. 6, domestic steel mills rejected a trade agreement negotiated by the Department of Commerce with the Common Market. On Oct. 21, U.S. mills accepted an agreement which included pipe and tubing and which called for lower shares on most products.

Market shares for licensed products are given below:

	Aug. 6 Proposal	Oct. 21 agreement (Carbon and Alloy) Except Wire Rods)
	Market Share—Pct	Market Share—Pct
Hot rolled Sheet & Strip	7.43	6.81
Cold rolled sheet	5.15	5.11
Plate	5.98	5.36
Structurals	10.90	9.91
Wire rods	4.29	4.29
Hot rolled bars	3.01	2.38
Coated sheet	3.32	3.27
Tin plate	2.20	2.20
Rails	8.90	8.90
Stainless steel sheet & strip & stainless steel plate	4.08	—
Sheet piling	—	21.85

What the Steel Agreement with Europe Does

Running from Nov. 1, 1982 through Dec. 31, 1985, the recent agreement is designed to control 99 pct of the steel imported by the U.S. from Europe.

The agreement calls for 10 major carbon and alloy products to be covered by licenses from the European Community. Had this system been in effect in 1981, says the U.S. Commerce Dept., imports of the licensed products would have been 330,000 tons less and would have accounted for 5.46 pct of total supply.

The U.S. Treasury Dept. has been directed by special legislation to deny admission to any of the 10 products not covered by licenses. In Europe the failure of an exporter to abide by the licensing procedure can result in fines, forfeiture of goods, and imprisonment.

A separate agreement aims at keeping the European share of the U.S. pipe and tube market below the 1979-81 average. Had this agreement applied in 1981, says the Commerce Dept., imports of European pipe and tube would have been 815,000 tons less and would have accounted for 5.9 pct of the U.S. market. Enforcement will be through consultation.

Had the overall agreement been in effect in 1981, says the Commerce Dept., total imports of European steel last year would have been 5.13 pct of the U.S. market.

the levying of duties would bring 'massive retaliation' and start a trade war. Steel leaders complained that they were pictured as the aggressors in a situation where they were the aggrieved parties.

"It is regrettable that the principal focus of this dispute has been on the filing of the cases rather than on the subsidization and dumping," said Mr. Jaicks.

The Administration evidently believed the prospect of trade sanctions would bring quick voluntary restraint by the Europeans. The domestic suits would have a "chilling effect" on steel imports from Europe, predicted Mr. Olmer in February.

This proved to be a naive assumption. More than 1.6 million tons of foreign steel were imported in February and nearly 1.7 million tons in May. In the first half of 1982, steel imports from the Common Market were up 31 pct.

Meanwhile, the trade suits were winding their way slowly through the judicial process. The first step was not promising for domestic mills. On Feb. 19, the International Trade Commission (ITC) ruled that there had been no significant injury in 54 of the 92 cases filed. However, the remaining 38 covered most of the European carbon steel tonnage.

From then on, the various deadlines were accompanied by a series of last ditch, final efforts at compromise. In early June, strenuous negotiations failed to produce an agreement and on June 11, the Commerce Dept. made its preliminary ruling in the subsidy cases.

Subsidy margins of 40 pct were found on structurals, plate and bars from Britain. Subsidies of about 20 pct were found on French products. Other margins were: Italy, 18 pct; South Africa, 9 to 16 pct; and Brazil, 8 pct.

For Dutch, Luxembourg and West German producers, the Commerce Dept. found very small subsidies or none at all. The uneven pattern of the margins was to be a problem throughout subsequent negotiations. A country like West Germany had little direct incentive to escape duties and enter into a voluntary agreement.

The next crunch was July 25, the last date on which the trade suits could be terminated without the U.S. industry's approval. There was no agreement on that date.

On August 6, the Commerce Dept. and the Common Market did come up with a settlement calling for Europe to have a 5.75 pct share of the U.S. market. Included in the package were most carbon steel products plus stainless flat rolled grades. Not included were tubular products, tool steel, or stainless rod and bar.

"We believe the negotiated proposal is neither fair nor equitable . . .," says Mr. Roderick in announcing the domestic industry's rejection.

The proposal was "totally unacceptable," said Adolph J. Lena, chairman of AL Tech Specialty Steel Corp. and chairman of the specialty advisory committee.

That seemed to be it. Preliminary margins in the dumping cases were set by Commerce Dept. on Aug. 10. These ranged from 1 pct on Belgium structurals to more than 40 pct on sheet from Italy.

On Aug. 25, the final ruling of the Commerce Dept. scaled down subsidy margins. "We are extremely disappointed . . .," said Mr. Roderick. He referred to "pressures that are undoubtedly being brought to bear on the Administration from EC countries."

Still to be dealt with are imports from Japan and Third World countries.

Then came the hearings of the International Trade Commission on the injury phase of the countervailing duty cases. These were notable mostly for an informal recess conversation in which it was revealed that U. S. Steel was preparing a Section 301 complaint against Japan. This involved the agreement which allegedly diverted Japanese steel from Europe to the U.S.

"That agreement not only dealt with tonnage but also with price," said Mr. Roderick later. "Under that document, imports out of Japan (which had been 2 million tons) were reduced 87 pct over a four-year period."

The agreement was secret, said Mr. Roderick. "You need a security clearance to even see the documents; clearly they were trying to hide it." It is illegal under GATT, said Mr. Roderick to offer trade concessions to one nation without offering the same terms to other trading partners.

Under Section 301, the compensation sought by U. S. Steel could be a reduction in Japan's steel shipments to the U.S. That remedy was sought in a similar case filed in 1976.

The trade commission delayed its final decision on the injury phase of the subsidy complaints as long as possible—until Oct. 15. ITC then ruled that U.S. producers had been injured in 14 of the 16 cases. Dismissed were the complaints involving sheet and plate from West Germany.

The ITC decision meant domestic producers had established an important point. After months of deliberation and countless legal manhours, the steel companies had convinced a reluctant government that a large portion of the import tonnage was based on unfair tactics.

After the decision, however, all attention went to what would happen next. The Commerce Dept. had until Oct. 21 to impose countervailing duties. At this point, there was frantic negotiation with the heads of states involved.

An awkward circumstance was that the preceding week found most steel leaders in Tokyo at the IISI meeting. Although they might be sharing a luncheon table, Mr. Roderick and European steel executives were barred by antitrust laws from direct conversations on trade matters.

To keep posted on developments, Mr. Roderick had to call Washington at midnight because of the time difference. The Europeans, likewise, had to communicate through round-about government channels. As late as Oct. 12, Mr. Roderick said there was only a 50-50 chance of an agreement.

The big sticking point was tubular steel. Mannesmann of West Germany is a leading producer of pipe. Because of a line drawn in Treaty of Paris, tubular products don't come under the authority of the Common Market's steel commission. And again, the Germans would not have been directly affected by countervailing duties.

After top level intervention and marathon negotiations by Secretary Baldrige, the pipe problem was resolved. Around noon on Oct. 21, the Commerce Dept. announced that an agreement has been negotiated and had been accepted by the U.S. industry. The dumping and countervailing duty suits of domestic mills were withdrawn.

Mr. Roderick expressed his satisfaction. "President Reagan gave full support to the domestic industry's position and to the negotiators."

The agreement set specific market shares for 10 carbon and alloy products. Six of the market percentages were lower than what has been proposed in August. The 10 producers are to be covered by European licenses and the aggregate share is to be no more than 5.46 pct.

The total European share, including licensed and unlicensed products, is to be more more than 5.13 pct. The U.S. Customs Bureau will check to see that all designated products are properly licensed. Mr. Roderick considers this enforcement provision one of the key points of the agreement.

The tubular arrangement is separate. It calls for European producers to have a 5.9 pct share of the market. The enforcement language is fuzzy, but given

the depressed state of the U.S. oil country market, it's likely the Europeans will comply.

In its evaluation, the Commerce Dept. said steel imports would have been 1.14 million tons less in 1981 had the European agreement been in effect. Domestic mills look for the agreement to reduce imports from the Common Market by about that amount in 1983.

Still to be dealt with are steel imports from Japan and Third World countries. Also hanging fire in late October were specialty steels. Stainless sheet and plate were included in the proposed August agreement with Europe but were dropped from the final settlement. Stainless bar and rod, along with tool steels, were never included.

If imports are hurting carbon steel producers, they are killing the specialty mills. Imports have captured 57 pct of the stainless rod market and 48 pct of the tool steel market.

"My conclusion," says Dr. Lena, "is that we are already in a trade war and we are losing."

Losses include the shutdown of Crucible Steel's Midland, Pa., plant and the bankruptcy of Guterl Special Steel Corp. "Unemployment in some specialty steel companies has soared to over 50 pct," said domestic producers in a letter to President Reagan.

The specialty mills have filed seven dumping or countervailing duty suits, most of them against European producers. The mills realize this is like trying to bring down a flock of bird with a rifle. There are so many products and so many small producers it is almost impossible to address the whole problem with individual complaints.

What the companies want is a 'shotgun' approach. With this in mind, the companies filed a Section 301 case with the United States Trade Representative. Charged with illegal subsidies were specialty producers in Britain, Italy, France, Sweden, Austria, and Belgium. (The complaint against Brazil was dismissed.)

Section 301 gives the government authority to make an overall settlement of the trade problem, the specialty people explain; the President can impose quotas, increase tariffs, or negotiate orderly marketing agreements.

"The President should use his authority under Section 301 to develop a worldwide solution to the specialty steel unfair-trade practice problem," said Richard P. Simmons, president of Allegheny Ludlum Steel Corp.

Joining the specialty steel people in their exhortations was Lloyd McBride, president of United Steelworkers of America (USWA). The Steelworkers have been bitterly critical of Reaganomics and there was talk that the Administration would try and salvage some union votes by announcing trade measures for specialty imports on election day or just before.

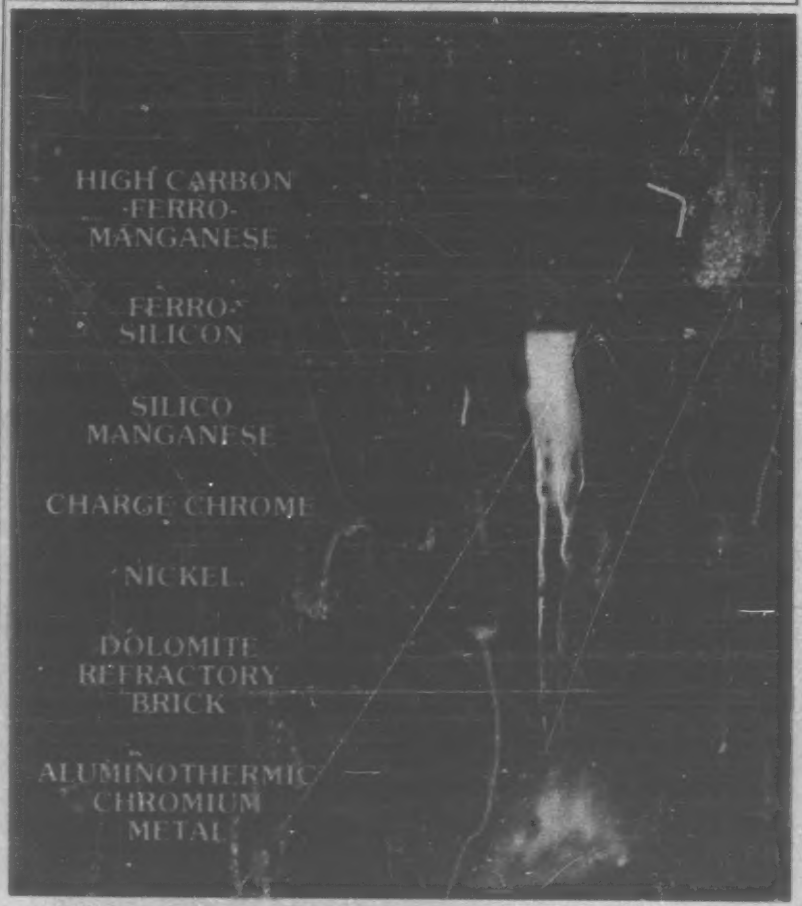
That day passed with no decision on the recommendation of Trade Representative William Brock. Mr. Brock reportedly proposed temporary restraints on specialty imports from the six European countries named in the complaint.

The retraints would remain in effect during an accelerated investigation of the cases. In addition, there would be efforts to negotiate specialty agreements with other nations.

Out of all this will probably come an agreement, or agreements, similar to the one covering European carbon steel. The fragmented nature of foreign specialty production is a problem that will have to be overcome.

"If the political will were there to do so," said Mr. Simmons, in early October, "the Europeans could negotiate a comprehensive agreement merely by sending different government officials (non-ECSC) to the table for discussion."

Unless there is an agreement or a restraint soon, specialty people fear carbon steel products from Europe will spill over into their market. A sharp September increase in stainless imports intensified the worries of domestic officials.



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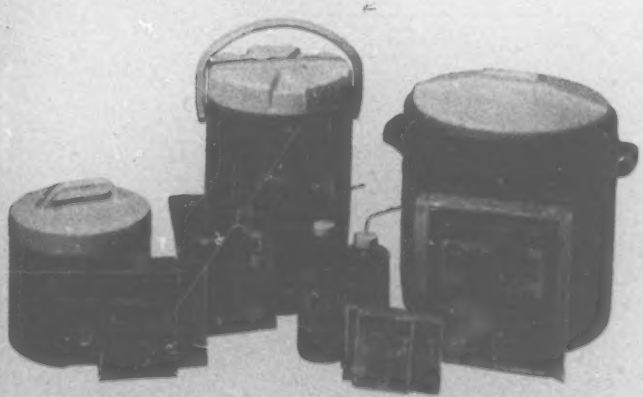

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The Japanese carbon steel situation seems less urgent. Japan's September deliveries to the U.S. were down 35 pct from September of 1981. The Japanese seem to be making good on their promise to pull back voluntarily.

Neither carbon steel nor specialty steel producers can expect permanent relief from import problems. The European carbon steel arrangement runs from Nov. 1, 1982 to Dec. 31, 1985. After three years, domestic mills will be on their own again.

Three years from now, the American steel industry will be a little more modern than it is today. Some continuous casting programs are going forward despite depressed conditions.

There should be some benefit from the consolidation of production and facilities. The steel workload will be concentrated on the most efficient mills.

Going with this will be a consolidation of the work force. Steel employment has fallen by 125,000 since August of 1981. The steel jobless rate is around 45 pct.

"It is important that all of us recognize that redundancy in labor will result from all the structural changes taking place in steel, in automotive . . . and in other manufacturing industries," says William R. Roesch, president of U. S. Steel.

Mr. Roesch sees basic steel going through an adjustment similar to that which cut coal mining employment in half after World War II.

This is not a very happy prospect, but does point up a key advantage of American steelmakers: They have complete discretion in gearing facilities and employment to the market.

That doesn't seem to be the case abroad. Willy Korf says the big European mills operate as employment agencies. In Japan, Nippon Kokan had about 33,000 employees in 1981. Although Nippon Kokan's operations have since fallen to around 60 pct, employment has risen to 35,000. Lifetime employment policies have barred layoffs.

If the world steel industry faces a prolonged recession, American mills are probably in the best position to scale downward. Domestic mills will also be benefitting from a more moderate rate of pay increase. The need for moderation was being conveyed to the Steelworkers in November contract talks.

What's really needed, of course, is a revival of the world steel market. Right now, there is no sign of even a partial recovery. □

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MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	156	141	153	224
Buffalo	30	30	30	60
Pittsburgh	126	115	126	308
Youngstown	68	50	67	124
Cleveland	81	83	104	140
Detroit	92	96	96	107
Chicago	326	337	341	516
Cincinnati	63	69	65	93
St. Louis	52	52	57	86
Southern	69	68	73	192
Western	48	48	65	127
U.S. Production	1,111	1,089	1,177	1,967

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective November 8, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	1,111	1,089	64,373	105,313
Capability Utilization Rate	37.6	36.8	49.2	80.3

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$203.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 51.17	$ 51.50	$ 52.50	$ 80.17
No. 2 bundles	$ 38.83	$ 38.83	$ 39.50	$ 54.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 52.50	$ 52.50	$ 55.50	$90.50
No. 1 steel, Philadelphia	54.50	55.50	55.50	68.50
No. 1 steel, Chicago	46.50	46.50	46.50	81.50
No. 1 bundles, Detroit	41.50	41.50	47.50	83.50
Low Phos., Youngstown	52.50	52.50	58.50	95.50
No. 1 mach'y cast., Pgh	64.50	64.50	66.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	111.50
No. 1 mach'y cast., Chi.	103.50	103.50	103.50	120.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective November 8, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	72.00	71.00-72.00	10/19/82
Lead	22.00-26.00	23.00-26.00	11/3/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00-42.00	41.00-42.00	10/5/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.35-$1.45
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $417.50
Indium, dollars per troy oz. ..... $2.85-$4.00
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$360-$380
Molybdenum, lb. tech. moly oxides, 20 lb. MO can ..... $6.85-$8.50
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $10.565
Vanadium $4.94
Zirconium sponge ..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Nov. 1—561.46
Nov. 2—561.46
Nov. 3—561.99
Nov. 4—559.57
Nov. 5—559.17

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	67½	58¼
Yellow brass	59¼	54⅛
Red brass	63	56½
Comm. bronze	64	57
Mang. bronze	58⅞	57⅛
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	57
No. 2 copper wire	51
Light copper	42

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	47
Light copper	38
No. 1 composition	51
No. 1 comp. turnings	47
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	26
Radiators	41

Aluminum

New mixed clips	24	—25
Old sheet	23	—24
Old cast	23	—24
Clean dry borings	24	—25

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	23	—24
Mixed L.C. clips	21	—22
Old sheets and cast	15	—16
Borings and turnings	12	—13
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	44	—45
No. 2 copper wire	37	—38
Light copper	32	—33
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	24	—25
Brass Pipe	28	—29
New soft brass clippings	36	—37

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	20	—21

Nickel

Nickel solids	115	—120
Nickel rod ends	115	—120
Nickel sheets, clips	115	—120
Nickel turnings	55	— 60

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

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MATERIALS NEWSFRONT

(Effective November 8, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	45.00 to	46.00
No. 1 dealer bundles	63.00 to	64.00
No. 1 factory bundles (auto)	60.00 to	61.00
No. 2 bundles	38.00 to	39.00
No. 1 busheling	60.00 to	61.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	67.00 to	68.00
Heavy turnings	45.00 to	46.00
No. 1 RR hvy. melting	65.00 to	66.00
Rails 2 ft. and under	80.00 to	81.00
Scrap rails, random lgth.	78.00 to	79.00
RR specialties	71.00 to	72.00
No. 1 machinery cast	64.00 to	65.00
Cupola cast	57.00 to	58.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	490.00 to	500.00
18-8 turnings	390.00 to	400.00

Chicago

No. 1 hvy. melting	$ 46.00 to	$ 47.00
No. 2 hvy. melting	42.00 to	43.00
No. 1 dealer bundles	55.00 to	56.00
No. 1 factory bundles (auto)	59.00 to	60.00
No. 2 dealer bundles	38.00 to	39.00
No. 1 busheling	56.00 to	57.00
Shredder scrap	55.00 to	56.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	33.00 to	34.00
Low phos. forge crop	76.00 to	77.00
Low phos. punchings plate ¼ in. and heavier	79.00 to	80.00
Low phos. 2 ft. and under	74.00 to	75.00
No. 1 RR hvy. melting	48.00 to	49.00
Scrap rails, random lgth.	49.00 to	50.00
Rerolling rails	85.00 to	86.00
Rails, 2 ft. and under	76.00 to	77.00
RR couplers and knuckles	69.00 to	70.00
RR car axles	102.00 to	103.00
No. 1 machinery cast	103.00 to	104.00
Cupola cast	89.00 to	90.00
Stove plate	76.00 to	77.00
Steel car wheels	59.00 to	60.00
Stainless		
18-8 bundles and solids	450.00 to	460.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	95.00 to	100.00
430 turnings	65.00 to	70.00

Philadelphia

No. 1 hvy. melting	$ 53.00 to	$ 56.00
No. 2 hvy. melting	48.00 to	51.00
No. 1 dealer bundles	65.00 to	68.00
No. 2 dealer bundles	38.00 to	41.00
No. 1 busheling	65.00 to	68.00
Shredder scrap	71.00 to	74.00
Machine shop turn.	18.00 to	21.00
Mixed bor. and turn.	18.00 to	21.00
Shoveling turnings	30.00 to	33.00
Clean cast chemical borings	40.00 to	43.00
Low phos. 5 ft. and under	60.00 to	63.00
Low phos. 2 ft. punchings	85.00 to	88.00
Electric furnace bundles	75.00 to	78.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	89.00 to	92.00
Cupola cast	55.00 to	58.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 36.00 to	$ 37.00
No. 2 hvy. melting	34.00 to	35.00
No. 1 dealer bundles	41.00 to	42.00
No. 2 bundles	18.00 to	19.00
No. 1 busheling	40.00 to	41.00
Drop forge flashings	21.00 to	22.00
Machine shop turn.	14.00 to	15.00
Mixed borings and turn.	7.00 to	8.00
Shoveling turnings	14.00 to	15.00
Cast iron borings	5.00 to	6.00
Heavy breakable cast	24.00 to	25.00
Mixed cupola cast	40.00 to	41.00
Automobile cast	58.00 to	59.00
Stainless		
18-8 bundles and solids	395.00 to	405.00
18-8 turnings	285.00 to	295.00
430 bundles and solids	70.00 to	80.00

Youngstown

No. 1 hvy. melting	$ 45.00 to	$ 46.00
No. 2 hvy. melting	30.00 to	31.00
No. 1 dealer bundles	51.00 to	52.00
No. 2 dealer bundles	30.00 to	31.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	8.00 to	9.00
Low phos. plate	52.00 to	53.00
Electric furnace bundles	52.00 to	53.00
Galvanized bundles	42.00 to	43.00

Cleveland

No. 1 hvy. melting	$ 42.00 to	$ 43.00
No. 2 hvy. melting	26.00 to	27.00
No. 1 dealer bundles	46.00 to	47.00
No. 1 factory bundles	51.00 to	52.00
No. 2 bundles	22.00 to	23.00
No. 1 busheling	48.00 to	49.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	72.00 to	73.00
Low phos. punchings plate	72.00 to	73.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	62.00 to	63.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	82.00 to	83.00
Rails, 18 in. and under	83.00 to	84.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	82.00 to	83.00
Cupola cast	82.00 to	83.00
Stove plate	57.00 to	58.00
Stainless		
18-8 bundles	375.00 to	385.00
18-8 turnings	295.00 to	305.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 25.00 to	$ 26.00
No. 2 hvy. melting	15.00 to	16.00
No. 1 busheling	32.00 to	33.00
No. 1 dealer bundles	30.00 to	31.00
No. 2 bundles	12.00 to	13.00
Machine shop turn.	1.00 to	2.00
Mixed bor. and turn.	8.00 to	9.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Low phos. plate	52.00 to	53.00
Structural and plate, 2 ft. and under	50.00 to	51.00
Rails, 2 ft. and under	42.00 to	43.00
Scrap rails, random lgth.	22.00 to	23.00
No. 1 machinery cast	65.00 to	66.00
No. 1 cupola cast	44.00 to	45.00

St. Louis

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	39.00 to	40.00
Foundry steel, 2 ft.	39.00 to	40.00
No. 1 dealer bundles	47.00 to	48.00
No. 2 bundles	36.00 to	37.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	47.00 to	48.00
Rails, random length	49.00 to	50.00
Rails, 18 in. and under	64.00 to	65.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 56.00 to	$ 57.00
No. 2 heavy melting	53.00 to	54.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	43.00 to	44.00
No. 1 busheling	54.00 to	55.00
Shredder scrap	72.00 to	73.00
Machine shop. turn.	20.00 to	21.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	52.00 to	53.00
Elec. furnace, 3 ft. & under	52.00 to	53.00
Structural and plate, 2 ft.	71.00 to	72.00
Structural and plate, 4 ft.	65.00 to	66.00
No. 1 RR hvy. melting	54.00 to	55.00
Scrap rails, random lgth.	59.00 to	60.00
Rails, 18 in. and under	74.00 to	75.00
Angles and splice bars	65.00 to	66.00
No. 1 cupola cast	76.00 to	77.00
Unstripped motor blocks	55.00 to	56.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 29.00 to	$ 30.00
No. 2 hvy. melting	27.00 to	28.00
No. 1 dealer bundles	30.00 to	31.00
No. 2 bundles	19.00 to	20.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	3.00 to	4.00
Cast iron borings	4.00 to	5.00
Low phos. 18 in. and under	54.00 to	55.00
Rails, random length	36.00 to	37.00
Rails, 2 ft. and under	63.00 to	64.00
No. 1 cupola cast	44.00 to	45.00
Heavy breakable cast	20.00 to	21.00
Drop broken cast	59.00 to	60.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 26.00 to	$ 27.00
No. 2 hvy. melting	22.00 to	24.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	400.00 to	425.00
18-8 turnings	350.00 to	375.00
430 prepared solids	90.00 to	100.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to	$ 30.00
No. 2 hvy. melting	20.00 to	22.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 bundles	16.00 to	18.00
No. 1 busheling	28.00 to	30.00
Shredder scrap	38.00 to	40.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	1.00 to	2.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	23.00 to	25.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	27.00 to	29.00
No. 2 dealer bundles	12.00 to	14.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	84.00 to	86.00

Los Angeles

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	9.00 to	11.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	85.00 to	87.00
No. 1 cupola cast	87.00 to	89.00

Seattle

No. 1 hvy. melting	$ 54.00 to	$ 56.00
No. 2 hvy. melting	43.00 to	45.00
No. 2 bundles	33.00 to	35.00
No. 1 cupola cast	89.00 to	91.00
Mixed yard cast	79.00 to	81.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 33.00
No. 2 heavy melting cut 2 ft. and under	30.00
No. 1 dealer bundles	40.00
No. 2 bundles	5.00
Mixed steel scrap	17.00
Bush. new fact. prep'd.	38.00
Bush. new fact. unprp'd.	30.00
Machine shop turn.	18.00
Short steel turn.	21.00
Mixed bor. and turn.	10.00
Cast scrap	30.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	43.00 to	44.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	8.00 to	9.00
Crushed turnings	22.00 to	24.00
Shredder scrap	55.00 to	56.00
Cut structural plate 2 ft. and under	77.00 to	78.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	66.00

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STEEL PRICES

Codes identify Producers listed in the Key on page 75. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10	$420.00
R3	$420.00
Midwest	
R3, U1, W5	$420.00
S1	$420.00
C10	$420.00
K2	$400.00
W5	$400.00
West	
B3(2)	$430.00
C6	$420.00
South	
A7	$420.00
Alloy, East	
R3, C10	$463.00
B3	$459.00
Midwest	
W8, W5	$459.00
S1, U1	$459.00
R3	$459.00
West	
B3	$469.00
C6	$469.00
South	
A7	$436.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7, N4	24.15
C20	22.90
W8	22.90
I3, T10, U1	23.90
West	
C6	22.85
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	24.15
W8	24.15
U1	23.90
I3	24.15
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	24.15
I3	24.15
West	
U1	24.40
C6	21.90
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut II Edge—all widths, East	
B3, U1	20.80
J3	20.80
Midwest	
A7	20.80
D1	20.80
S1, J3, D1	20.80
W3	20.80
N4	17.50
W5	20.80
U1	20.80
B3, G2, I3, I4, M2, R3, J3, G3	20.80
West	
K1	20.80
B3	24.70
South	
R3	20.80
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
R7, S10, B4	29.60
P15	24.80
S7	Cmp*
U1	33.25
D1(1)	Cmp*
Midwest	
G4	24.80
I4	26.15
W14	22.95
S1, U1, J4	33.25
T4	Cmp*

*Composite pricing

West	
U1	33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, East (plus extras)*	
Midwest	
M2, G3, R3, W3, I4, J3, G2	20.80
A7	20.80
S1	20.80
I3	20.80
West	
K1	20.80
South	
R3	20.80
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	23.20
G4	25.80
I4	23.95
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	42.60
P15	32.10
S1	39.90
Midwest	
I4	41.75
S1	37.65

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	20.80
J3	20.80
U1	20.80
Midwest	
A7, U1, B3, G2, G3, I3, M2, R3, W3	20.80
S1, W5, D1	20.80
J3	20.80
I4	19.50
West	
U1	21.30
K1	20.80
South	
R3	20.80
Cold-Rolled, East, Class I	
B3(2), U1	24.65
J3	24.65
Midwest	
B3, I3, G3, R3, M2, U1(2)	24.65
G2, W3, M11	24.65
I4	22.00
J3, A7	24.65
S1, W5, D1	24.65
West	
U1	25.15
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	26.25
Midwest	
J3, D1	26.25
I3, W5, S1	27.15
U1, A7, R3, Y1	26.25
G2, W3, M11	26.25
West	
K1	27.15
South	
U1	26.25
R3	26.25
Enameling, Midwest	
A7, I3, U1, J3	26.15
S1	26.50
Long-Terne, Midwest	
W5	28.30
A7, U1	27.60
R3	27.60

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
B3	23.25
U1	22.35
South	
G7	22.35

Tinplate

Electrolytic Tinplate	
Single Reduced (70 lb)	
East	**per base box**
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3 (75 lb)	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$25.44
U1	26.79
South	
U1	$26.29
Double Reduced (55 lb)	
Midwest	
M11 (50 lb)	$21.49
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$20.39
U1	21.99
South	
U1	$21.49
Black Plate	
Single Reduced (75 lb)	
East	
B3	$23.36
Midwest	
J3	$23.36
M11	23.36
I3, U1, W5	23.36
W3	23.36
West	
K1	$24.01
U1	23.36
Double Reduced (55 lb)	
East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

**70 lb—base weight extra 45¢
***50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3	23.95
R5	23.95
B3(3), J3	23.95
U1, C10	23.95
Midwest	
A7, C20	23.95
N4	23.95
U1, I3, I4	23.95
R3, T10	24.075
K2	23.95
West	
B3	23.95
C6	24.45
U1	23.95
B3	24.70
South	
A8	20.65
A7	23.95
C16	23.95
Cold-Finished Carbon, East	
A11	22.15
J3(2)	31.50
R3	31.50
C21	21.15
J3, L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	29.50
M1	23.025
B4, C10	31.00
J3	31.50
Midwest	
B5, W10, Y1, W8, R3	31.00
J3	32.15
B1	19.80
L2	30.75
N9	31.00
P3	19.85
W14	22.20
J3(3)	31.00
B5	31.25
J3	32.15
West	
B5	31.20
B5	34.90
R3	31.20-34.90
South	
B5	32.85
J3	31.95
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10	26.10
R3	26.10
J3	26.10
Midwest	
A7, U1	26.10
I3, C10	26.10
R3	26.10
I4	24.85
West	
B3, U1	26.10
B5	18.50
C6	26.60
B3	27.10
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	35.40
M1	28.025
R4	25.65
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	35.40
Midwest	
B5, R3, C10	34.85
C2	28.275
J3, M9, W10	35.40
P3	22.75
B1	22.70
N9	34.85
L2	34.85
B5	35.10
J3	36.00
J3	34.85
West	
R3	35.20-38.25
B5	35.20
B5	38.25
South	
J3	35.40
C16	28.00
B5	36.75

Plates

Carbon Steel, East	
B3(2)	25.25
L4	24.25
P2	24.25
U1	24.25
J3	25.25
Midwest	
B3, G3, R3, G2, S1	25.25
I3, I4, W5	25.25
J3, A7	21.70
U1	24.25
West	
A7, B3, C6, O2	25.25
K1	23.50
U1	24.25
South	
R3	25.25
A7	25.25
U1	24.25
Alloy, East	
B3, J3	33.05
U1, L4	33.05
P2	32.05
Midwest	
B3	33.05
G2, G3	31.05
I4, U1	33.05
West	
B3	33.05
O2	30.55
K1	31.30
South	
A7	27.55

Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
A7, R3	24.60
N4, W7	27.40
K2	24.20
South	
U1	27.70
A8	22.85
West	
A7	25.95
C8	24.95

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STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilber B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Corp., Detroit
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities* / City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	25.04	29.02	33.66	34.17	29.52	31.46	21.27	42.11	43.20	54.80	71.74	74.69
Baltimore	32.25	36.51	42.48	42.85	35.56	37.48	23.10	48.63	56.80	61.08	71.68	77.88
Birmingham	25.90	30.24	36.47	35.03	29.67	31.68	22.25	43.40	50.53	51.39	69.70	76.27
Boston	23.43	28.25	31.93	44.27	37.43	37.68	21.80	47.75	57.60	60.66	68.49	75.74
Buffalo	27.75	34.41	36.35	43.01	35.20	32.46	18.26	45.85	54.11	55.64	62.09	70.72
Chicago	21.78	28.33	30.78	31.84	29.67	28.35	16.86	39.94	37.97	47.00	54.02	59.36
Cincinnati	22.30	28.89	33.39	33.39	28.93	32.06	17.72	43.24	41.70	48.16	53.82	60.37
Cleveland	27.94	32.57	34.35	34.35	28.73	32.56	18.40	42.81	40.45	50.48	56.63	62.50
Denver	32.69	38.65	38.66	42.32	36.91	38.18	22.79	49.35	56.13	65.40	72.50	81.22
Detroit	22.66	31.48	32.73	33.22	28.59	23.84	17.62	40.94	38.69	43.81	53.47	59.90
Houston	23.83	28.28	32.53	41.35	34.12	37.90	47.18	42.45	56.79	64.97	73.05	81.09
Kansas City	23.34	27.07	31.59	32.39	32.19	33.18	20.29	44.35	50.64	58.69	64.36	73.32
Los Angeles	34.08	36.78	39.14	47.53	38.37	40.45	32.55	50.66	62.71	72.33	78.31	87.97
Memphis	31.11	31.16	35.27	37.84	31.07	33.84	32.34	39.82	52.82	56.96	67.85	77.44
Milwaukee	22.11	27.93	30.74	31.97	30.45	16.92	16.02	40.02	38.60	47.77	53.91	59.67
New York	22.00	26.53	30.70	42.40	31.67	32.93	20.83	48.87	50.98	59.83	68.45	75.35
Philadelphia	28.57	34.80	37.22	44.85	33.40	37.64	22.78	48.62	52.89	60.22	69.85	76.05
Pittsburgh	23.85	28.39	32.99	40.86	33.39	37.00	21.35	43.55	48.95	59.88	66.19	72.84
Portland	32.04	37.16	41.51	33.10	34.82	38.20	53.64	56.85	61.00	64.10	66.10	....
San Francisco	31.07	36.66	39.71	46.66	39.32	40.88	30.78	51.14	63.99	72.88	79.58	88.10
Seattle	29.85	35.14	37.68	46.76	32.89	35.32	29.86	51.38	64.02	70.14	73.83	87.67
Spokane	21.08	30.56	33.56	36.69	35.18	25.16	20.32	41.00	42.02	46.30	....	58.32
St. Louis	24.60	29.12	32.77	36.50	28.14	32.45	19.00	43.42	44.47	52.13	59.81	65.93
St. Paul	23.43	27.76	32.10	35.20	29.31	32.38	17.22	43.95	40.17	49.68	52.53	61.93

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ¾-2 15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1⅝" round; Cold drawn—1" round; Hot-rolled 4140—1⅝" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

Chilton's

DECEMBER 15, 1982

IRON AGE

THE MAGAZINE FOR METALWORKING MANAGEMENT

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A SCRAPBOOK OF BUSINESS HUMOR AMERICAN

MANUFACTURING SYSTEMS SERIES 35: A BUYER'S GUIDE TO PERSONAL COMPUTERS

IN CUTTING FLUIDS, CLEANLINESS IS A VIRTUE

TEMPER EMBRITTLEMENT: STEEL'S NAGGING VIRUS

BEST AVAILABLE COPY

VOL. 225, NO. 35

IRON AGE

DECEMBER 15, 1982

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METALWORKING ORDER TRENDS

Orders: Not only down again, but down even more sharply

Hopes for a fourth quarter break in the slide in new orders were dashed when October data was released by the U.S. Commerce Dept.

Orders flowing to producers of durable goods were down—again—in the opening month of the final quarter of 1982. It was a steep decline.

October orders totaled $69.9 billion, down 4.6 pct from September dollar volume. Compared to the year-ago month, orders were down about 11 pct.

Orders to metalworking industries, which make up between 85 and 90 pct of total manufactured durable goods, led in the fall. Total dollar volume for the six major metalworking industry groups that make up the table here, were down 5.2 pct from September and down 11.4 pct from the year-ago month.

The five major metalworking groups are primary metals, machinery (both electrical and nonelectrical), transportation equipment, fabricated metal products and instruments.

Orders for these products totaled $58.4 billion in October and $61.6 billion in September.

Further, October marked the 15th consecutive month in which backlogs of unfilled orders for all U.S. manufacturers showed a decrease. This has happened as shipments, declining in their own right, have still managed to stay ahead of an even lower new orders inflow.

In October orders, the big loser in metalworking was the steel industry. Orders for steel were down a whopping 13 pct from the previous month. Also, orders received by machinery industries were down by nearly 5 pct and orders for transportation equipment were down a bit more than 3 pct.

In the transportation equipment category, a large fall in orders for motor vehicles and parts was only partially offset by increases in orders for aircraft, shipbuilding and railroad equipment.

In October, inventories still loomed as a big block to any soon-at-hand pickup in orders. Stocks are still too high to trigger orders for replenishment on the part of durable goods manufacturers. In October, inventory-shipments ratios for every metalworking industry group, rose.

In short, it won't be stock rebuilding that will get business perking up in metalworking.

It will take nothing less than a pickup in new orders received to get things rolling again.

Source: U.S. Dept. of Commerce Billions of dollars, seasonally adjusted monthly total, unless otherwise noted		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
Capital Expenditures (Annual Rates)				
U.S. Industry, Total	4th Qtr.	$324.5*	$320.2	$327.8
Manufacturing, Total	4th Qtr.	122.9*	123.1	126.9
Manufacturing, Durable Goods	4th Qtr.	58.8*	60.0	60.8
Mining Industry	4th Qtr.	16.2*	15.7	16.8
Key Indicators, Durable Goods Manufacturing				
New Orders	Oct.	69.9	73.3	77.8
Shipments	Oct.	72.4	76.6	82.6
Inventories	Oct.	182.3	182.8	186.7
Unfilled Orders	Oct.	284.1	286.7	312.7
New Orders, Metalworking				
Capital Goods Producers, Nondefense Industries	Oct.	20.2	20.3	21.0
Capital Goods Producers, Defense Industries	Oct.	4.7	4.3	3.8
Primary Metals, Total	Oct.	7.0	8.0	10.2
Steel (SIC 331)	Oct.	2.8	3.4	5.1
Iron & Steel Castings (SIC 332)	Oct.	0.6	0.6	1.2
Nonferrous Metals	Oct.	3.6	4.0	3.9
Nonelectrical Mach.-Equip. Industries, Total	Oct.	13.8	14.0	16.0
Engines & Turbines	Oct.	1.2	0.9	1.4
Farm Machinery & Equipment (Shipments)	Oct.	1.0	1.0	1.2
Construction, Mining & Materials Hdlg. Equip.	Oct.	2.1	2.5	3.1
General Industrial Machinery	Oct.	1.0	1.1	1.6
Fluid Power Equipment** (Index-1972=100)	Oct.	150	165	265
Metalworking Machinery	Oct.	0.6	0.6	0.8
Machine Tools, Total (Millions $, unadjusted)***	Oct.	119.2	86.9	216.5
Machine Tools, Metal-Cutting***	Oct.	72.9	52.6	157.1
Machine Tools, Metal-Forming***	Oct.	46.3	34.3	59.4
Electrical Mach. & Equip. Industries, Total	Oct.	11.0	12.0	10.4
Elec. Transmission Equip. & Industrial Apparatus	Oct.	1.5	1.6	1.5
Household Appliances	Oct.	1.0	1.1	0.9
Communication Equipment	Oct.	3.7	4.6	3.0
Transportation Equip. Industrial, Total	Oct.	14.4	14.8	15.6
Motor Vehicles & Parts (Shipments)	Oct.	7.9	9.6	10.7
Aircraft, Missiles & Parts	Oct.	5.2	4.2	3.4
Shipbuilding & Military Tanks	Oct.	0.7	0.4	0.8
Fabricated Metal Products, Total	Oct.	8.4	8.7	9.3
Instruments, Total	Oct.	3.8	4.1	4.2

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA.

GUIDELINES FOR BUYING A PERSONAL COMPUTER

Personal computers will outsell mainframe computers in a few years. But it takes some definition of goals to hone in on the right one.

By Alice M. Greene

The most surprising fact about personal computers is that most of those sold are not used as personal computers. Although shipments of personal computers will pass the one million mark in 1982, the vast majority of these computers, 54 pct according to International Data Corp. (IDC) will be used in business/professional applications.

The personal computer brings computing power to individuals, for sure, and more of them are cropping up in private homes. But, the business/professional market has been and will continue to be the largest and fastest growing market for desktop computers.

"The desktop computer will become a status symbol at larger companies for many executives," says the Framingham, Mass. based research firm. "At the smaller firm, the availability of a low cost computer with sophisticated capabilities will be met enthusiastically."

The home/hobby market is only now becoming a reality. "The huge home market encompasses more than 80 million homes in the U.S. The forecasted installed base covers less than 10 pct of this," says IDC.

"The real impetus for growth will come from parents who don't want their children left behind; as nearly all schools at all levels start having computers, children will push to get them in the home."

Already many colleges and universities require that an entering student have a personal computer, just as these schools required a slide rule or a calculator in years past.

The educational and scientific markets for personal computers are shrinking by comparison with the business and home markets, but are still important for personal computer manufacturers.

What all this adds up to is very distinct sets of criteria from which to choose the "best" computer.

What characteristics are universal, which suit the home market, and which are most important for the small business or professional user? The size of the computer system or the eventual size of the system may vary depending on where it will be used, but a lot of the same reasoning applies.

The most basic decision is to know what you are going to do with the computer once you get it. If you plan to use it in business, determine what is your most important application, then look at potential computer purchases with a view as to how they handle that application.

At home, also, it is best not to buy a computer "just to own a personal computer." Computer literacy may not be enough reason for a substantial investment. Computer games can be played on far less expensive equipment than a serious personal computer. If the children's education is the goal, make sure you look for a computer with a lot of educational software.

Once you have decided what your computer will do, look for software that will solve your problem. Even personal computer manufacturers, Digital Equipment Corp. among them, suggest that a buyer choose software before hardware.

All computer novices, amateur or professional, want to write their own software. But to be practical, it is best to buy something you know works, that you can see demonstrated. Using packaged applications software gets a job done faster and with more accuracy. It also helps build the computer literacy which makes subsequent personal programming simpler.

Applications programs are being churned out all over the country and the world for almost every conceivable application. But, applications programs must be compatible with the systems software of the computer, that is, the software that is resident in the machine which makes the computer actually run.

These operating systems vary from one personal computer vendor to another, although some more popular versions are increasing in dominance. Some, such as CP/M, UNIX and MS/DOS are used by several computer vendors. They were developed

(Cont. on p. 52)

The IBM Personal Computer can generate and display charts, graphs, text and numerical information. The system can accommodate both office and home applications.

(Cont. from p. 49)

by research-type companies as general purpose operating systems. Other operating systems were developed by personal computer manufacturers and are proprietary for their own products. Radio Shack, a division of Tandy Corp., uses TRSDOS, and Apple Computer Inc. uses Apple DOS.

There are benefits to both approaches. Software written for more generic operating systems is more transportable to other systems. On the other hand, customized software should fit a particular computer better.

If as some predict, some of the new personal computer companies fail to survive, users locked into one computer/one operating system may find themselves in a predicament.

And the future must be very much in the mind of a prospective user or buyer of a personal computer. Once a computer is installed, applications multiply. There is always more to do. Most of the leading personal computers today offer a lot of applications software already. And much third party software is being written for these same market leaders.

It is hard to believe, for example, that there is any application one can imagine that isn't now available or currently being planned for the new personal computer line from International Business Machines (IBM).

Much the same is true for Digital Equipment, Apple, Radio Shack, Commodore and the other leading vendors. Others may be more specialized.

What is important is to pick a computer which will have the capability needed not just at the time of purchase, but a few years out. This is true as much for a computer for truly home use as for a personal computer used in a business office.

Size is part of future capability; and size is a hardware function. Size can be thought of as processing capability and storage capability. Earlier introductions were 8-bit systems which could address 64 kilobytes of RAM (random access memory) memory. Later, the 16-bit versions were introduced with more directly addressable memory.

Today, 32-bit models are being introduced. Hewlett-Packard has recently introduced a family of 32-bit computers which the company claims are low enough in price to allow individual scientists and engineers have their own personal mainframes. Intended primarily for computer-aided engineering applications, the HP-900 family features networking, a choice of operating systems and triple CPUs (central processing units), at prices that range from $28,250 to $64,565.

This size system is obviously not intended to manage the family budget, but it does indicate the trend toward providing personal computer capability for an ever growing range users.

Eventually, there will be many independent data sources available to personal computer users. Some exist already. It is possible to tie into financial data bases to get current stock market activity reports today. This area has just begun. Data will be available to individual users over phone lines; for individuals working in a corporate environment, internal corporate networks will bring data to individuals.

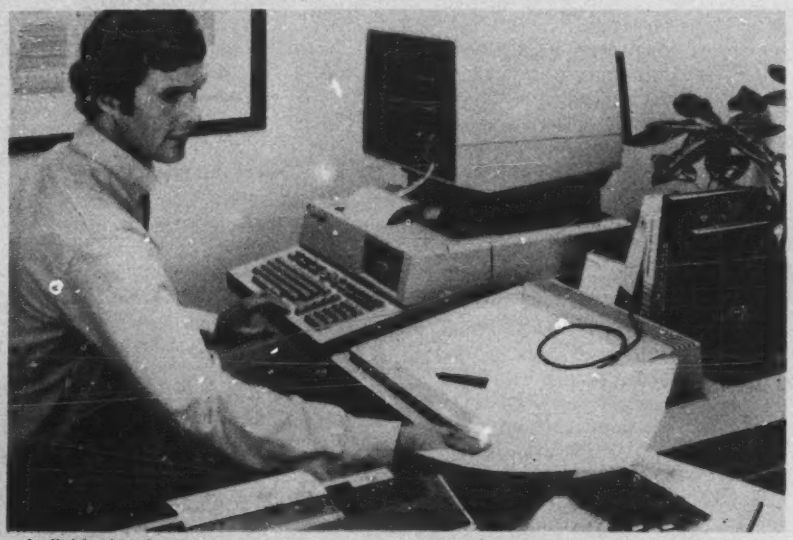
Electronic mail, word processing—a lot of individual needs will be made available to individuals working at their own computer through company communications schemes.

In fact, the use of personal computers by individuals at companies where they are employed has created some problems for those companies. Until recently, only large mainframe computers and minicomputers fell within the realm of most Management Information Systems (MIS) departments.

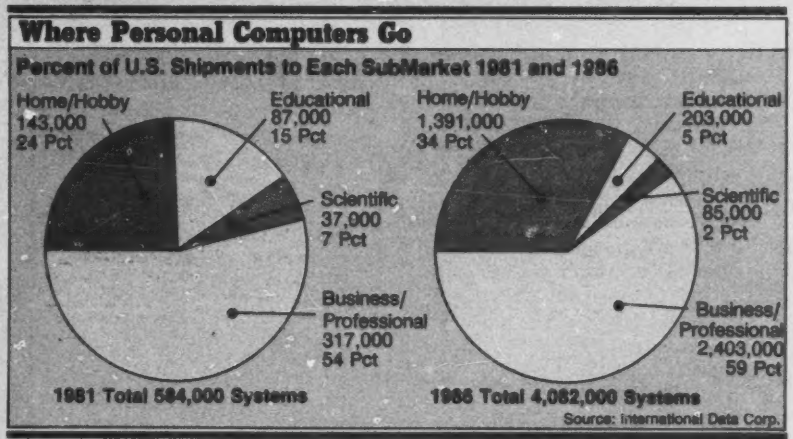
Today, "the prospect of thousands of personal computers within large user organizations is not unimaginable," claims Aaron Goldberg, senior research analyst for the desktop/personal computer market for International Data Corp. "If left to itself, the growth and proliferation of personal computers could well become an unmanageable nightmare for the MIS department.

"Most organizations have not developed a firm plan for personal computer usage. However, the time is ripe if the MIS department wants to get a handle on the problem before the installed population makes any attempt at control impossible."

This integration by companies of the personal computer phenomenon becomes even more critical if, as IDC projects, desktop/personal computer shipments will exceed mainframe shipment values by 1986.



Individual scientists can have their own 32-bit computer from Hewlett-Packard.



Getting back to an individual's decision, after considering software, hardware, future requirements for expansion, for networking at home or in the office, prospective users should give some thought to service, reliability, training.

An IBM spokesperson sums up the decisions to be made: "In selecting a personal computer, as in choosing any type of computer, a major consideration is what the individual wants to be accomplish. With that in mind, the availability of software enters the picture. From that the user must assess the hardware capabilities and functions required to run that software.

"The user should always anticipate future needs and interests; thus the desirability of expansion and upgrade capabilities.

"Finally, there is the matter of price, service availability, the overall technical quality of both hardware and software, and quite often the 'user-friendliness' of a particular system," he concludes.

Whatever personal computing needs exist, there are a host of products waiting to fill those needs.

At the low end of the spectrum, the new ZX81 from Sinclair Research brings computing power to an individual for under $100. Sinclair technology is also available in Timex/Sinclair computers under a license from Sinclair.

Going up in price a bit, the under $500 range offers the Commodore VIC-20, Atari 400, TI 99/4A from Texas Instruments and the TRS-80 Color Computer.

Prices vary, of course, depending on the size of the system. Most can be expanded for more storage capacity with the addition of disk capacity. Peripherals add to both the price and the useability of systems for many users.

Video displays vary from a home television set to screens that draw graphs. Data storage and printing capability also varies in price and sophistication. Digital Equipment Corp. offers a five-million byte Winchester Disk Drive with an integral controller that can store the "equivalent of 2500 typewritten pages," according to the company.

The more sophisticated options suit the more sophisticated needs of professional/business offices. The larger companies that have entered the personal computer market seem to aim their products at this market segment. These computer giants, IBM, Sperry Univac, Hewlett-Packard, Digital Equipment Corp. have products which span the market from the individual professional working in his or her home to a similar individual working for a corporation in a network with other personal computer users.

When IBM announced its personal computer, C. B. Rogers, Jr., vice president and group executive, General Business Group, said, "This is the computer for just about everyone who has ever wanted a personal system at the office, on the university campus or at home."

The IBM Personal Computer can be tailored to fit an individual's needs, but the thrust of the system is the middle to high end of the market. A basic system with color graphics for home use attached to an audio tape cassette player and a television set would sell for approximately $1565, in IBM Product Centers. A more typical system for home or school with color graphics, a memory of 64,000 bytes, a single diskette drive and the IBM Disk Operating System would be priced at $2665. An expanded system for business with two diskette drives, an IBM display and a printer would cost $4425, according to the company.

Digital Equipment Corp. (DEC) announced three models which "set new and higher standards for personal computing," according to DEC president Ken Olsen. The company's three personal computers cover a range of applications. The Rainbow 100, the DECmate II, and the Professional 300 series range in sophistication and price from under $3500 to about $5000.

"We have a personal computer that runs both 8- and 16-bit CP/M applications interchangeably. We have a personal computer optimized for office management. And we have introduced a series of personal computers with a proprietary architecture that's highly compatible with our larger PDP-11 and VAX systems," according to the company.

"This new personal computer architecture provides the basis for exciting new applications in graphics, in telephone management, and in local area networking and distributed processing."

These advanced features make it clear that a major thrust for these computers is in a business office. Newer office environments need to provide personal computing features, whether these be word processing or file management or engineering calculations.

Hewlett-Packard has a whole family of what is called personal office computers. The HP Series 100 computers are aimed at and customized for professional office applications, including word processing, decision support, presentation graphics, programming and small-business accounting.

These systems function both as stand-alone computers and as intelligent teminals to larger computer systems and networks.

And the HP 120 is transportable for occasional use at home.

Hewlett-Packard has also introduced a personal technical computer, the HP Series 200, Model 16, a 16-bit computer designed for scientists and engineers, according to P. R. Welch, marketing manager for HP's Desktop Computer Div.

Numerous HP applications-software packs are available for the Model 16. These include computer-aided engineering tools such as ac circuit analysis, and digital filter design, mathematics modules and business aids.

In 1982, there will be $12 billion spent on personal computers, according to International Data Corp. This staggering success in a year that had few economic successes to brag about has resulted in a number of new business ventures. The prospective buyer must choose carefully between them. □

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CAD/CAM Systems Explode In Metalworking, Dec. 28, pp. 48-51

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EFFECTIVE NOVEMBER 15, 1982

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	160	156	116	236
Buffalo	31	30	30	60
Pittsburgh	137	126	137	284
Youngstown	56	68	67	124
Cleveland	65	81	95	109
Detroit	98	92	103	106
Chicago	322	326	333	513
Cincinnati	64	63	64	91
St. Louis	54	52	55	75
Southern	70	69	61	196
Western	49	48	50	128
U.S. Production	1,106	1,111	1,111	1,922

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective November 15, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	1,106	1,111	65,479	107,255
Capability Utilization Rate	37.4	37.6	49.0	80.0

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$203.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 51.17	$ 51.17	$ 52.17	$ 75.83
No. 2 bundles	$ 38.83	$ 38.83	$ 39.17	$ 53.83

Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 52.50	$ 52.50	$ 54.50	$85.50
No. 1 steel, Philadelphia	54.50	54.50	55.50	66.50
No. 1 steel, Chicago	46.50	46.50	46.50	75.50
No. 1 bundles, Detroit	41.50	41.50	44.50	73.50
Low Phos., Youngstown	52.50	52.50	56.50	85.50
No. 1 mach'y cast., Pgh	64.50	64.50	64.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	111.50
No. 1 mach'y cast., Chi.	103.50	103.50	103.50	117.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective November 15, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	68.00	68.00-70.00	11/12/82
Lead	21.50-26.00	22.00-26.00	11/12/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00-42.00	40.00-42.00	11/9/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be.....$201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200.....$166.00
Bismuth, ton lots .....$1.35-$1.45
Cadmium, under one ton .....$1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8%.....$3.75
Cobalt, 99%, cathode.....$12.50
Gold per troy oz. $403.20
Indium, dollars per troy oz.....$2.85-$4.00
Iridium, dollars per troy oz.....$600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$365-$385
Molybdenum, lb. tech. moly oxides, 20 lb. MO can .....$6.85-$8.50
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz.....$9.35
Vanadium $4.94
Zirconium sponge.....$12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Nov. 8—559.04 Nov. 11—561.69
Nov. 9—559.44 Nov. 12—558.25
Nov. 10—561.69

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	67½	58¼
Yellow brass	59¼	54⅛
Red brass	63	56½
Comm. bronze	64	57
Mang. bronze	58⅞	57⅛
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	49
Light copper	40

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	51
No. 2 copper wire	45
Light copper	36
No. 1 composition	50
No. 1 comp. turnings	47
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	26
Radiators	41

Aluminum

New mixed clips	24	—25
Old sheet	23	—24
Old cast	23	—24
Clean dry borings	23	—24

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	23	—24
Mixed L.C. clips	21	—22
Old sheets and cast	15	—16
Borings and turnings	12	—13
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	45	—46
No. 2 copper wire	38	—39
Light copper	33	—34
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	25	—26
Brass Pipe	28	—29
New soft brass clippings	35	—36

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	19	—20

Nickel

Nickel solids	110	—115
Nickel rod ends	110	—115
Nickel sheets, clips	110	—115
Nickel turnings	50	— 55

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

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MATERIALS NEWSFRONT

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Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	45.00 to	46.00
No. 1 dealer bundles	65.00 to	66.00
No. 1 factory bundles (auto)	60.00 to	61.00
No. 2 bundles	38.00 to	39.00
No. 1 busheling	60.00 to	61.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	67.00 to	68.00
Heavy turnings	45.00 to	46.00
No. 1 RR hvy. melting	65.00 to	66.00
Rails 2 ft. and under	80.00 to	81.00
Scrap rails, random lgth.	78.00 to	79.00
RR specialties	71.00 to	72.00
No. 1 machinery cast	64.00 to	65.00
Cupola cast	57.00 to	58.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	490.00 to	500.00
18-8 turnings	390.00 to	400.00

Chicago

No. 1 hvy. melting	$ 46.00 to	$ 47.00
No. 2 hvy. melting	42.00 to	43.00
No. 1 dealer bundles	55.00 to	56.00
No. 1 factory bundles (auto)	59.00 to	60.00
No. 2 dealer bundles	38.00 to	39.00
No. 1 busheling	56.00 to	57.00
Shredder scrap	55.00 to	56.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	33.00 to	34.00
Low phos. forge crop	76.00 to	77.00
Low phos. punchings plate ¼ in. and heavier	79.00 to	80.00
Low phos. 2 ft. and under	74.00 to	75.00
No. 1 RR hvy. melting	48.00 to	49.00
Scrap rails, random lgth	49.00 to	50.00
Reroller rails	85.00 to	86.00
Rails, 2 ft. and under	76.00 to	77.00
RR couplers and knuckles	69.00 to	70.00
RR car axles	102.00 to	103.00
No. 1 machinery cast	103.00 to	104.00
Cupola cast	89.00 to	90.00
Stove plate	76.00 to	77.00
Steel car wheels	59.00 to	60.00
Stainless		
18-8 bundles and solids	440.00 to	450.00
18-8 turnings	340.00 to	350.00
430 bundles and solids	95.00 to	100.00
430 turnings	65.00 to	70.00

Philadelphia

No. 1 hvy. melting	$ 53.00 to	$ 56.00
No. 2 hvy. melting	48.00 to	51.00
No. 1 dealer bundles	65.00 to	68.00
No. 2 dealer bundles	38.00 to	41.00
No. 1 busheling	65.00 to	68.00
Shredder scrap	71.00 to	74.00
Machine shop turn.	18.00 to	21.00
Mixed bor. and turn.	18.00 to	21.00
Shoveling turnings	30.00 to	33.00
Clean cast chemical borings	40.00 to	43.00
Low phos. 5 ft. and under	60.00 to	63.00
Low phos. 2 ft. punchings	85.00 to	88.00
Electric furnace bundles	75.00 to	78.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	89.00 to	92.00
Cupola cast	55.00 to	58.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 36.00 to	$ 37.00
No. 2 hvy. melting	34.00 to	35.00
No. 1 dealer bundles	41.00 to	42.00
No. 2 bundles	18.00 to	19.00
No. 1 busheling	40.00 to	41.00
Drop forge flashings	21.00 to	22.00
Machine shop turn.	14.00 to	15.00
Mixed borings and turn.	7.00 to	8.00
Shoveling turnings	14.00 to	15.00
Cast iron borings	5.00 to	6.00
Heavy breakable cast	24.00 to	25.00
Mixed cupola cast	40.00 to	41.00
Automobile cast	58.00 to	59.00
Stainless		
18-8 bundles and solids	395.00 to	405.00
18-8 turnings	285.00 to	295.00
430 bundles and solids	70.00 to	80.00

Youngstown

No. 1 hvy. melting	$ 45.00 to	$ 46.00
No. 2 hvy. melting	30.00 to	31.00
No. 1 dealer bundles	51.00 to	52.00
No. 2 dealer bundles	30.00 to	31.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	8.00 to	9.00
Low phos. plate	52.00 to	53.00
Electric furnace bundles	52.00 to	53.00
Galvanized bundles	42.00 to	43.00

Cleveland

No. 1 hvy. melting	$ 42.00 to	$ 43.00
No. 2 hvy. melting	24.00 to	25.00
No. 1 dealer bundles	46.00 to	47.00
No. 1 factory bundles	51.00 to	52.00
No. 2 bundles	22.00 to	23.00
No. 1 busheling	47.00 to	48.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	70.00 to	71.00
Low phos. punchings plate	70.00 to	71.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	82.00 to	83.00
Rails, 18 in. and under	83.00 to	84.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	82.00 to	83.00
Cupola cast	82.00 to	83.00
Stove plate	57.00 to	58.00
Stainless		
18-8 bundles	375.00 to	385.00
18-8 turnings	295.00 to	305.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 25.00 to	$ 26.00
No. 2 hvy. melting	15.00 to	16.00
No. 1 busheling	32.00 to	33.00
No. 1 dealer bundles	30.00 to	31.00
No. 2 bundles	12.00 to	13.00
Machine shop turn.	1.00 to	2.00
Mixed bor. and turn.	8.00 to	9.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Low phos. plate	52.00 to	53.00
Structural and plate, 2 ft. and under	50.00 to	51.00
Rails, 2 ft. and under	42.00 to	43.00
Scrap rails, random lgth.	22.00 to	23.00
No. 1 machinery cast	65.00 to	66.00
No. 1 cupola cast	44.00 to	45.00

St. Louis

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	39.00 to	40.00
Foundry steel, 2 ft.	39.00 to	40.00
No. 1 dealer bundles	47.00 to	48.00
No. 2 bundles	36.00 to	37.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	47.00 to	48.00
Rails, random length	49.00 to	50.00
Rails, 18 in. and under	64.00 to	65.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 56.00 to	$ 57.00
No. 2 heavy melting	53.00 to	54.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	43.00 to	44.00
No. 1 busheling	53.00 to	54.00
Shredder scrap	72.00 to	73.00
Machine shop. turn.	20.00 to	21.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	52.00 to	53.00
Elec. furnace, 3 ft. & under	52.00 to	53.00
Structural and plate, 2 ft.	71.00 to	72.00
Structural and plate, 4 ft.	65.00 to	66.00
No. 1 RR hvy. melting	54.00 to	55.00
Scrap rails, random lgth.	59.00 to	60.00
Rails, 18 in. and under	74.00 to	75.00
Angles and splice bars	65.00 to	66.00
No. 1 cupola cast	76.00 to	77.00
Unstripped motor blocks	55.00 to	56.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to	$ 29.00
No. 2 hvy. melting	27.00 to	28.00
No. 1 dealer bundles	29.00 to	30.00
No. 2 bundles	18.00 to	19.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	3.00 to	4.00
Cast iron borings	4.00 to	5.00
Low phos. 18 in. and under	53.00 to	54.00
Rails, random length	35.00 to	36.00
Rails, 2 ft. and under	61.00 to	62.00
No. 1 cupola cast	44.00 to	45.00
Heavy breakable cast	20.00 to	21.00
Drop broken cast	59.00 to	60.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 26.00 to	$ 27.00
No. 2 hvy. melting	22.00 to	24.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	400.00 to	425.00
18-8 turnings	350.00 to	375.00
430 prepared solids	90.00 to	100.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to	$ 30.00
No. 2 hvy. melting	20.00 to	22.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 bundles	16.00 to	18.00
No. 1 busheling	28.00 to	30.00
Shredder scrap	38.00 to	40.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	1.00 to	2.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	23.00 to	25.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	27.00 to	29.00
No. 1 dealer bundles	25.00 to	27.00
No. 2 dealer bundles	8.00 to	10.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 53.00 to	$ 55.00
No. 2 hvy. melting	42.00 to	44.00
No. 2 bundles	32.00 to	34.00
No. 1 cupola cast	88.00 to	90.00
Mixed yard cast	78.00 to	80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 33.00
No. 2 heavy melting cut 2 ft. and under	30.00
No. 1 dealer bundles	40.00
No. 2 bundles	5.00
Mixed steel scrap	17.00
Bush. new fact. prep'd.	38.00
Bush. new fact. unprp'd.	30.00
Machine shop turn.	18.00
Short steel turn.	21.00
Mixed bor. and turn.	10.00
Cast scrap	30.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	43.00 to	44.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	8.00 to	9.00
Crushed turnings	22.00 to	24.00
Shredder scrap	55.00 to	56.00
Cut structural plate 2 ft. and under	77.00 to	78.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	66.00

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Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	149	160	141	201
Buffalo	29	31	30	58
Pittsburgh	139	137	115	310
Youngstown	53	56	50	132
Cleveland	64	65	83	98
Detroit	105	98	96	107
Chicago	297	322	337	491
Cincinnati	57	64	69	95
St. Louis	56	54	52	85
Southern	59	70	68	200
Western	47	49	48	126
U.S. Production	1,055	1,106	1,089	1,903

Source: American Iron & Steel Institute

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51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

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Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

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**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective November 22, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	1,055	1,106	66,746	109,122
Capability Utilization Rate	35.7	37.4	48.8	79.6
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron* * (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$203.00
Scrap No. 1 hvy.* * * (Gross ton = 2240 lbs.)	$ 51.17	$ 51.17	$ 51.50	$ 75.83
No. 2 bundles	$ 38.50	$ 38.83	$ 38.83	$ 53.83
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh ..	$ 52.50	$ 52.50	$ 52.50	$85.50
No. 1 steel, Philadelphia	54.50	54.50	55.50	66.50
No. 1 steel, Chicago.....	46.50	46.50	46.50	75.50
No. 1 bundles, Detroit...	41.50	41.50	41.50	73.50
Low Phos., Youngstown	52.50	52.50	52.50	85.50
No. 1 mach'y cast., Pgh	64.50	64.50	64.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	111.50
No. 1 mach'y cast., Chi.	103.50	103.50	103.50	117.50

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Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	68.00	68.00-70.00	11/12/82
Lead	20.50-26.00	21.50-26.00	11/19/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00-42.00	40.00-42.00	11/9/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.35-$1.45
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $410.50
Indium, dollars per troy oz..... $2.85-$4.00
Iridium, dollars per troy oz..... $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. .. $365-$385
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz..... $9.88
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Nov. 15—Holiday
Nov. 16—558.91
Nov. 17—559.31
Nov. 18—559.17
Nov. 19—560.23

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	66⅛	56¼
Yellow brass	57⅞	52¾
Red brass	61¼	54¾
Comm. bronze	62¼	55¼
Mang. bronze	57¾	56
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	49
Light copper	39

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	51
No. 2 copper wire	45
Light copper	35
No. 1 composition	50
No. 1 comp. turnings	47
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	26
Radiators	41

Aluminum

New mixed clips	24	—25
Old sheet	23	—24
Old cast	23	—24
Clean dry borings	23	—24

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	22	—23
Mixed L.C. clips	20	—21
Old sheets and cast	14	—15
Borings and turnings	11	—12
Duraluminum clippings	21	—22

Copper and Brass

No. 1 copper wire	45	—46
No. 2 copper wire	38	—39
Light copper	33	—34
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	25	—26
Brass Pipe	28	—29
New soft brass clippings	35	—36

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	18	—19

Nickel

Nickel solids	110	—115
Nickel rod ends	110	—115
Nickel sheets, clips	110	—115
Nickel turnings	50	— 55

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

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EFFECTIVE NOVEMBER 22, 1982 MATERIALS NEWSFRONT

(Effective November 22, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	45.00 to	46.00
No. 1 dealer bundles	65.00 to	66.00
No. 1 factory bundles (auto)	60.00 to	61.00
No. 2 bundles	37.00 to	38.00
No. 1 busheling	59.00 to	60.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	67.00 to	68.00
Heavy turnings	45.00 to	46.00
No. 1 RR hvy. melting	65.00 to	66.00
Rails 2 ft. and under	80.00 to	81.00
Scrap rails, random lgth	78.00 to	79.00
RR specialties	71.00 to	72.00
No. 1 machinery cast	64.00 to	65.00
Cupola cast	57.00 to	58.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	490.00 to	500.00
18-8 turnings	390.00 to	400.00

Chicago

No. 1 hvy. melting	$ 46.00 to	$ 47.00
No. 2 hvy. melting	42.00 to	43.00
No. 1 dealer bundles	56.00 to	57.00
No. 1 factory bundles (auto)	59.00 to	60.00
No. 2 dealer bundles	38.00 to	39.00
No. 1 busheling	56.00 to	57.00
Shredder scrap	55.00 to	56.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	33.00 to	34.00
Low phos. forge crop	76.00 to	77.00
Low phos. punchings plate ¼ in. and heavier	79.00 to	80.00
Low phos. 2 ft. and under	74.00 to	75.00
No. 1 RR hvy. melting	48.00 to	49.00
Scrap rails, random lgth	49.00 to	50.00
Reroller rails	85.00 to	86.00
Rails, 2 ft. and under	76.00 to	77.00
RR couplers and knuckles	69.00 to	70.00
RR car axles	102.00 to	103.00
No. 1 machinery cast	103.00 to	104.00
Cupola cast	89.00 to	90.00
Stove plate	76.00 to	77.00
Steel car wheels	59.00 to	60.00
Stainless		
18-8 bundles and solids	440.00 to	450.00
18-8 turnings	340.00 to	350.00
430 bundles and solids	95.00 to	100.00
430 turnings	65.00 to	70.00

Philadelphia

No. 1 hvy. melting	$ 53.00 to	$ 56.00
No. 2 hvy. melting	48.00 to	51.00
No. 1 dealer bundles	65.00 to	68.00
No. 2 dealer bundles	38.00 to	41.00
No. 1 busheling	65.00 to	68.00
Shredder scrap	71.00 to	74.00
Machine shop turn.	18.00 to	21.00
Mixed bor. and turn.	18.00 to	21.00
Shoveling turnings	30.00 to	33.00
Clean cast chemical borings	40.00 to	43.00
Low phos. 5 ft. and under	60.00 to	63.00
Low phos. 2 ft. punchings	85.00 to	88.00
Electric furnace bundles	75.00 to	78.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	89.00 to	92.00
Cupola cast	55.00 to	58.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 36.00 to	$ 37.00
No. 2 hvy. melting	34.00 to	35.00
No. 1 dealer bundles	41.00 to	42.00
No. 2 bundles	18.00 to	19.00
No. 1 busheling	40.00 to	41.00
Drop forge flashings	21.00 to	22.00
Machine shop turn.	14.00 to	15.00
Mixed borings and turn.	7.00 to	8.00
Shoveling turnings	14.00 to	15.00
Cast iron borings	5.00 to	6.00
Heavy breakable cast	24.00 to	25.00
Mixed cupola cast	40.00 to	41.00
Automobile cast	58.00 to	59.00
Stainless		
18-8 bundles and solids	395.00 to	405.00
18-8 turnings	285.00 to	295.00
430 bundles and solids	70.00 to	80.00

Youngstown

No. 1 hvy. melting	$ 45.00 to	$ 46.00
No. 2 hvy. melting	30.00 to	31.00
No. 1 dealer bundles	51.00 to	52.00
No. 2 dealer bundles	30.00 to	31.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	8.00 to	9.00
Low phos. plate	52.00 to	53.00
Electric furnace bundles	52.00 to	53.00
Galvanized bundles	42.00 to	43.00

Cleveland

No. 1 hvy. melting	$ 42.00 to	$ 43.00
No. 2 hvy. melting	24.00 to	25.00
No. 1 dealer bundles	46.00 to	47.00
No. 1 factory bundles	51.00 to	52.00
No. 2 bundles	22.00 to	23.00
No. 1 busheling	47.00 to	48.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	70.00 to	71.00
Low phos. punchings plate	70.00 to	71.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	82.00 to	83.00
Rails, 18 in. and under	83.00 to	84.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	82.00 to	83.00
Cupola cast	82.00 to	83.00
Stove plate	57.00 to	58.00
Stainless		
18-8 bundles	375.00 to	385.00
18-8 turnings	295.00 to	305.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 25.00 to	$ 26.00
No. 2 hvy. melting	15.00 to	16.00
No. 1 busheling	30.00 to	31.00
No. 1 dealer bundles	28.00 to	29.00
No. 2 bundles	12.00 to	13.00
Machine shop turn.	1.00 to	2.00
Mixed bor. and turn.	8.00 to	9.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Low phos. plate	48.00 to	49.00
Structural and plate, 2 ft. and under	46.00 to	47.00
Rails, 2 ft. and under	42.00 to	43.00
Scrap rails, random lgth	22.00 to	23.00
No. 1 machinery cast	63.00 to	64.00
No. 1 cupola cast	42.00 to	43.00

St. Louis

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	39.00 to	40.00
Foundry steel, 2 ft.	39.00 to	40.00
No. 1 dealer bundles	47.00 to	48.00
No. 2 bundles	36.00 to	37.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	47.00 to	48.00
Rails, random length	49.00 to	50.00
Rails, 18 in. and under	64.00 to	65.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 56.00 to	$ 57.00
No. 2 heavy melting	53.00 to	54.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	43.00 to	44.00
No. 1 busheling	53.00 to	54.00
Shredder scrap	72.00 to	73.00
Machine shop. turn.	20.00 to	21.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	52.00 to	53.00
Elec. furnace, 3 ft. & under	52.00 to	53.00
Structural and plate, 2 ft.	71.00 to	72.00
Structural and plate, 4 ft.	65.00 to	66.00
No. 1 RR hvy. melting	54.00 to	55.00
Scrap rails, random lgth	59.00 to	60.00
Rails, 18 in. and under	74.00 to	75.00
Angles and splice bars	65.00 to	66.00
No. 1 cupola cast	76.00 to	77.00
Unstripped motor blocks	55.00 to	56.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 27.00 to	$ 28.00
No. 2 hvy. melting	26.00 to	27.00
No. 1 dealer bundles	28.00 to	29.00
No. 2 bundles	14.00 to	15.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	3.00 to	4.00
Cast iron borings	4.00 to	5.00
Low phos. 18 in. and under	52.00 to	53.00
Rails, random length	34.00 to	35.00
Rails, 2 ft. and under	59.00 to	60.00
No. 1 cupola cast	44.00 to	45.00
Heavy breakable cast	20.00 to	21.00
Drop broken cast	59.00 to	60.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 26.00 to	$ 27.00
No. 2 hvy. melting	22.00 to	24.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	400.00 to	425.00
18-8 turnings	350.00 to	375.00
430 prepared solids	90.00 to	100.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to	$ 30.00
No. 2 hvy. melting	20.00 to	22.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 bundles	16.00 to	18.00
No. 1 busheling	28.00 to	30.00
Shredder scrap	38.00 to	40.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	1.00 to	2.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	23.00 to	25.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	27.00 to	29.00
No. 1 dealer bundles	25.00 to	27.00
No. 2 dealer bundles	8.00 to	10.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 53.00 to	$ 55.00
No. 2 hvy. melting	42.00 to	44.00
No. 2 bundles	32.00 to	34.00
No. 1 cupola cast	88.00 to	90.00
Mixed yard cast	78.00 to	80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 33.00
No. 2 heavy melting cut 2 ft. and under	30.00
No. 1 dealer bundles	40.00
No. 2 bundles	5.00
Mixed steel scrap	17.00
Bush. new fact. prep'd.	38.00
Bush. new fact. unprp'd.	30.00
Machine shop turn.	18.00
Short steel turn.	21.00
Mixed bor. and turn.	10.00
Cast scrap	30.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	43.00 to	44.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	8.00 to	9.00
Crushed turnings	22.00 to	24.00
Shredder scrap	55.00 to	56.00
Cut structural plate 2 ft. and under	77.00 to	78.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	66.00

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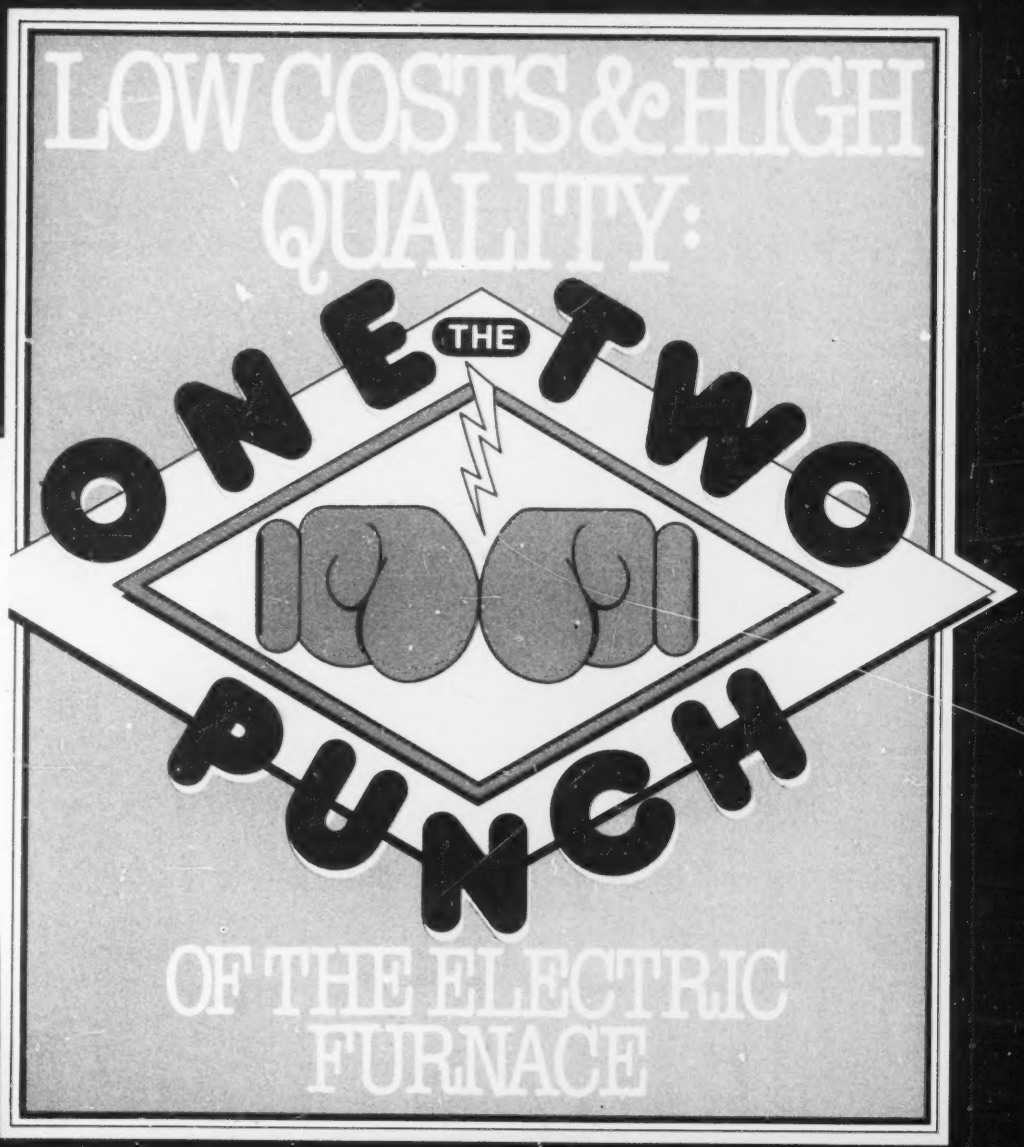
Chilton's

IRONAGE

THE MAGAZINE FOR METAL PRODUCING MANAGEMENT

JANUARY 3, 198



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STEEL'S ENERGY BATTLE:
STILL OPPORTUNITIES FOR MORE SAVINGS

CENTRIFUGAL CASTING OF HIGH CHROME ROLLS
WINNING CONVERTS IN THE U.S.

ANNUAL METALWORKING FORECAST:
A FROZEN ECONOMY BEGINS TO THAW

VOL. 226, NO. 1

IRON AGE

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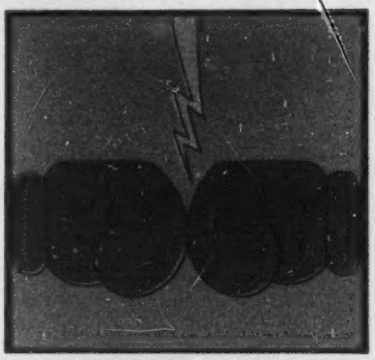

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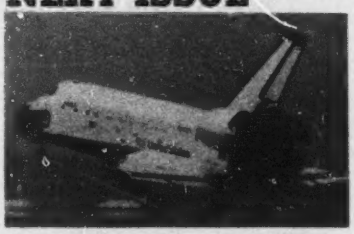

How metal matrix composites keep the Shuttle flying.

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ANNUAL FORECAST ISSUE

THE FROZEN ECONOMY BEGINS ITS THAW

A faint light started to break over a darkened economic horizon as 1982 came to a close.

That glow was sparked by hopeful signs in a long fight against a long recession.

And the signs were bright enough to encourage forecasters, almost to a man, to predict recovery for the U.S. economy this year.

The envisioned recovery is a very moderate one. The consensus forecast for growth, as measured by inflation-adjusted Gross National Product, comes to between 2.5 pct and 3 pct for the year.

It may be a modest enough recovery, but in view of what a downer 1982 turned out to be, 1983 may seem robust by comparison. Still, the very moderation of the perceived recovery means that some elements of the economy will share little, or not at all, in it this year. Of significance to metalworking industries, one of those bypassed elements is almost certain to be business investment in new plant and equipment.

Last year was not a year for metalworking industries. This year will be better, but it almost certainly won't be a banner one. To a great degree, as the health of capital spending goes, so goes the health of metalworking.

As for the overall outlook, *Iron Age* finds itself about in line with 'the crowd.' As noted on the chart here, a GNP growth of 2.9 pct is forecast. This growth

rate is about one-half the rate following the other big post-war recession of 1973-75.

Of course, a moderate recovery may be just what the doctor ordered. The economy is, after all, still reeling from a hang-over following one of the worst inflation binges in the nation's history. The recovery just could not be explosive without inflation taking off in a mad spiral again.

So, what are the bright signs that are causing that glow on the horizon? Why recovery in 1983?

For one, there are fundamentalists who see in the sheer length of the current recession good reason for a turnaround. It is 17 months old this month. And that is the longest for any recession since the days of the Great Depression of the 30's.

Probably of greater pertinence, in terms of a force for recovery, is the recent dramatic decline in inflation rates. Price-cooling is something that has demonstrably triggered business recoveries.

As 1982 closed, prices for consumer products and services were running at about a 5 pct annual rise rate. That was down from almost 12 pct in 1980 and down from 7 pct in 1981.

And prices paid at the industry wholesale level for goods and services were running at less than 5 pct at year-end 1982. That followed yearly rates of 12.4 pct and 9 pct.

More than just a sharp drop in inflation rates, there has been a very significant cooling in the traditional volcanic areas of price pressures. The key volatile price elements—energy, food and housing—have been, and are being, substantively reduced. They are simply fading as a prime inflation threat. And, collectively, that is something new to happen in such a cyclical setting.

Too, the core rate of inflation—worker wages and benefits—has been turned back sharply, and much more so than in past similar cyclical phases.

Another reason for expecting recovery this year centers on a shift that warms the heart of all in metalworking. Interest rates are down. The prime rate, for example, near year-end, was around 11 pct, and weakening. The rate in 1981 averaged nearly 19 pct.

Just a few weeks ago, the two economists known as Dr. Death and Dr. Doom—who have often correctly called the turn on interest rates—played happier tunes on their pipes than for a long, long time.

Henry Kaufman (Dr. Doom), chief economist for the investment firm of Salomon Brothers Inc., and Albert M. Wojnilower (Dr. Death), chief economist at First Boston Corp., another investment house, both predicted further declines in short-term interest rates.

These analysts based their latest forecasts on the prospects for recovery moderate enough not to put severe strains on credit markets as Goliath government raided those same markets.

Too, both experts see continued easing of Federal Reserve Board policies on money supply and further lowering of the discount rate—the interest rate the Fed charges member banks that borrow from it.

In short, these seers, and others, perceive a new mellow mood on the part of the Fed. They see the central bank swinging from grim inflation fighting to trying to put some zip in the economy.

The Fed has been able to shift into its new stimulative role because the great slack in the economy precludes chances of inflation being reignited. Some 11 pct of the workforce is idle, as well as about one-third of the nation's production capacity.

And, finally, it is on the square marked 'consumer' where most of the blue chips have been placed in betting on recovery this year. Paraphrasing a biblical tale, one economist says

it is the consumer who "must lead us out of the wilderness."

And it looks like this hero of past recoveries can come through again. The consumer has upped his savings sharply, trimmed back his borrowing and had an improvement in his real income as inflation cooled. Too, a mid-year 1983 10 pct tax cut won't hurt.

The far 'frontier' of consumer sentiment and spending is known to be the housing market. And action is finally coming on that long-inactive front. Fred Napolitano, president of the National Assn. of Home Builders, last month predicted a 30 pct increase in new home sales for 1983.

"There's been a turnaround in all the key indicators in recent months," he said. "Mortgage interest rates have plummeted from 18 to 12 pct levels, while housing starts, building permits and home sales have shown some signs of life and are heading in the right direction for the first time in three years."

It is falling interest rates that are performing most of the still-modest magic throughout the consumer sector. In addition to the housing evidence, the temporary special low rates offered by auto companies in late 1982 worked wonders in clearing out 1982 model-year leftovers. The clear-up was the best scored in 12 years.

Despite some rays of sunshine, there is a long, dark shadow cast across the U.S. economic landscape as the year starts.

The shadow doesn't come from the high unemployment rate. High unemployment may be "tragic" as President Reagan says, and it may be heart-breaking. But it is **not** a leading economic indicator. It is misery that points to misery that went before.

It is huge Federal government budget deficits that cast the long, dark shadow.

Even top economists within the Administration state flatly that monstrous and still-swelling deficits could well abort economic recovery. Martin Feldstein, chairman of the Presi-

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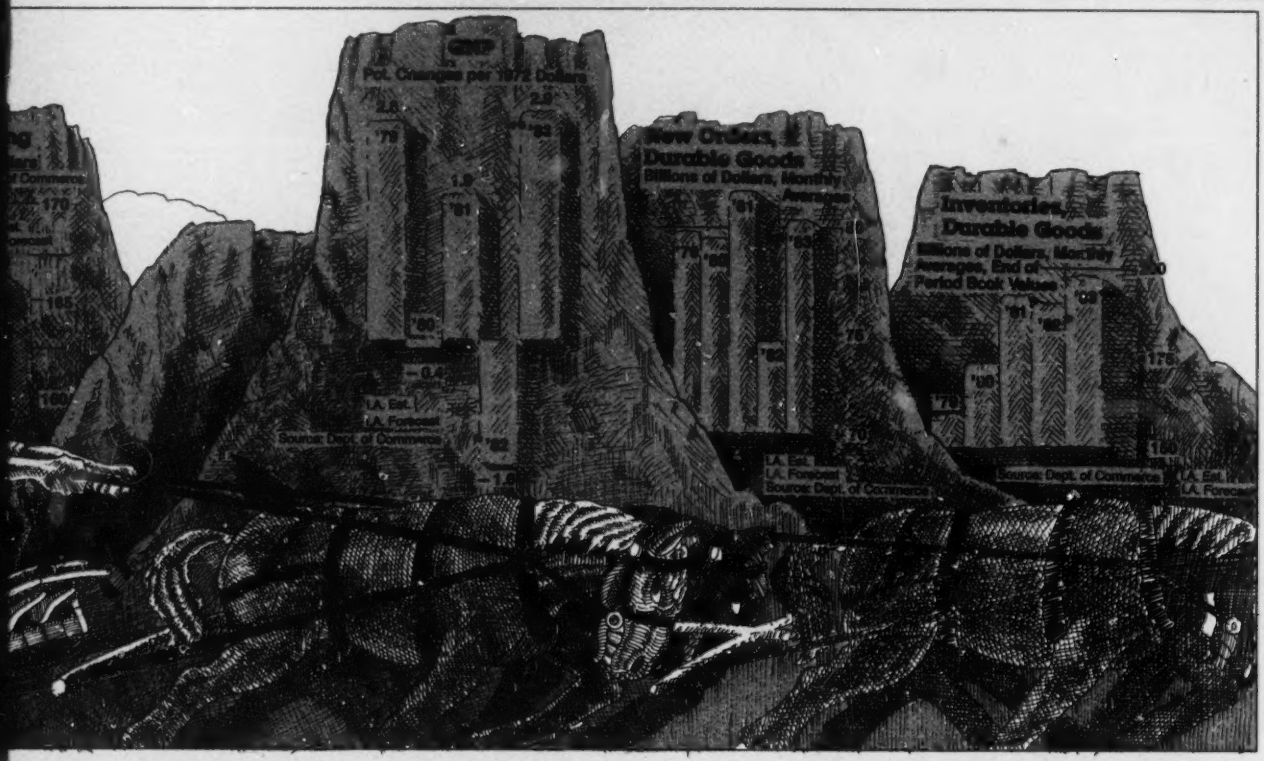


dent's Council of Economic Advisers, told a Congressional committee last month, "I don't see how we can have a healthy economic recovery unless we have deficits coming down, and coming down substantially."

The budget deficit in fiscal year 1982 (ended October 31), amounted to $111 billion. Budget Director David A. Stockman forecasts that the deficit in the current fiscal year will be $185 billion. And, as for 1984 and 1985—well, he's looking for a flood of red ink rolling up to $190 and $200 billion each year.

The previous deficit record high came in 1976 and amounted to what is now a seemingly paltry $66 billion.

If Washington does nothing about cutting down the deficit, there is the feeling that economic recovery could 'hit the wall.'

If Washington does get the deficit down, that can only happen through higher taxes and/or reduced government spending. And either of those actions would impact on recovery—in now unknown ways.

But it will probably be the years beyond 1983 that will be most effected by what is done in Washington this year. That's why, in sum, it looks like the modest recovery so widely forecast for this year is likely to hold its ground, monster deficit or not.

Still, recovery for the overall economy is one thing, and recovery for each and every sector of the economy is another.

As noted, the widely-forecast moderate recovery for 1983 won't have enough power to pull all elements of the economy up the hill with it. A likely 'orphan' in the recovery this year is business capital investment.

Always a laggard in any recovery, plant spending will likely be further behind this time than is usual. For one, it is deeper in the recession hole than the overall economy; its growth has been slower for longer. Also, two of the key determinants of plant spending—corporate profits and plant capacity usage—have been harder hit than usual by the recession.

On top of that, long-term interest rates have not come down anything like short-term rates. And it is long-term credit that underpins much of capital outlays. Corporations are now turning to long-term borrowing, but that is chiefly to pay off piled-up short-term debt, not to finance plant expenditures.

The mood and intentions of industry on plant spending are seen in the Conference Board's latest survey of capital appropriations by the 1000 largest manufacturing companies covering the third quarter last year. These appropriations fell to their lowest level since late 1978.

The board noted that, "The outlook for actual capital spending in 1983 is clearly subdued."

These findings are about in line with the U.S. Commerce Dept.'s latest survey (late October & November) of U.S. business executives on their own capital spending plans for the first half this year. The executives said they planned to cut their spending (inflation-adjusted) by 0.4 pct in the first quarter and by 0.2 pct in the second period. Remember, this follows a year when plant spending fell by about 5 pct.

Former Presidential adviser Alan Greenspan is gloomier on real plant outlays for this year; he sees a decline of about 7 pct.

The fortunes of metalworking industries usually move right along with business investment. And, clearly, that investment is not shaping up well at all for 1983.

So, recovery? Yes. For the U.S. economy. But it's going to be a longer wait for plant spending and the metalworking industries that depend on that investment.

But, of course, without any recovery this year for the economy, the wait for metalworking's recovery would be that much longer.

John Baxter

ANNUAL FORECAST

Steel

Steel shipments are expected to rise from 60 million tons in 1982 to 73 million tons in 1983.

If the forecasts are right, 1983 will be the second worst year since 1962. Last year was the worst in the memories of veteran steelmakers.

In looking ahead to 1983, about the only consolation for steel producers is that the forecasts are probably wrong. The chances of error are all on the upside.

However, steel producers are in no mood to anticipate pleasant surprises. Last year was a time of continuing disappointment. Until there is hard evidence of a significant improvement, steel people are going to plan on another bad year.

Approaching the year end, no improvement was in sight. If anything, the early orders for the first quarter of 1983 indicated a decline from the fourth quarter of 1982.

This picture could change. Operating with little or no backlog, the steel industry is offering short lead times. From 30 to 40 pct of the steel shipped is ordered in the month of delivery. An upturn could develop with little or no advance warning.

On paper, you can make a case for such an upturn. In 1982, users liquidated 10 million to 13 million tons of steel inventory. Steel producers reduced their own stocks by more than 3 million tons.

If the calculations are right, users should at least stabilize their steel inventories soon. That would boost steel shipments by a million tons a month. The forecasts assume this will happen. Nearly all the improvement predicted for 1983 is accounted for by the shift from inventory cutting to inventory stability.

It's entirely possible steel users will go from inventory cutting to inventory building. For the first time since 1971, users face the threat of a national steel strike. Steel labor contracts expire in August and there no longer is an arbitration agreement to prevent a strike.

The leverage of strike "hedge" buying was shown in 1971 steel labor negotiations. Steel shipments rose from about 6 million tons the previous November to nearly 10 million tons in June of 1971. That was during a recession.

There is certainly the potential for a market upheaval but, again, there is no disposition to count on one. Making for pessimism is the general weakness of the metalworking economy. Mill analysts look for this weakness to extend through 1983.

In the industrial sector, which accounts for two-thirds of steel consumption, further declines are predicted for heavy construction, machinery, railroad products, and oil and gas drilling.

Consumer markets are expected to begin turning upward. Modest gains are predicted for automotive, home building and appliances. These aren't expected to offset the industrial losses. Total consumption of steel is seen falling from about 87 million tons in 1982 to 86 million tons in 1983.

The consumption estimates show the extent of the metalworking depression. Not since 1964 has consumption been as low as 86 million tons. In 1975, which was considered a bad recession year, more than 95 million tons of steel were consumed.

With industrial activity so depressed, steel producers have to be bearish. Inventory estimates notwithstanding, people aren't going to buy more steel when they're using less steel. And there's no assurance the usage rate has hit bottom.

What's needed is an auto boom. The direct effect of the auto business is enormous. In the first half of 1980, the auto companies were building cars and building inventory. Steel shipments rose to 8.7 million tons in March. Supply tightened enough to bring general inventory building.

The market collapsed when auto plants pulled back in the second quarter of 1980, but the brief spurt showed the importance of this one market. A sustained auto boom now would mean immediate direct impact and would eventually revive the capital goods sector.

In this connection, it's worth noting that auto sales were up sharply in November. From an annual rate of 5.4 million in October, sales rose to a rate of 7.5 million in mid-November.

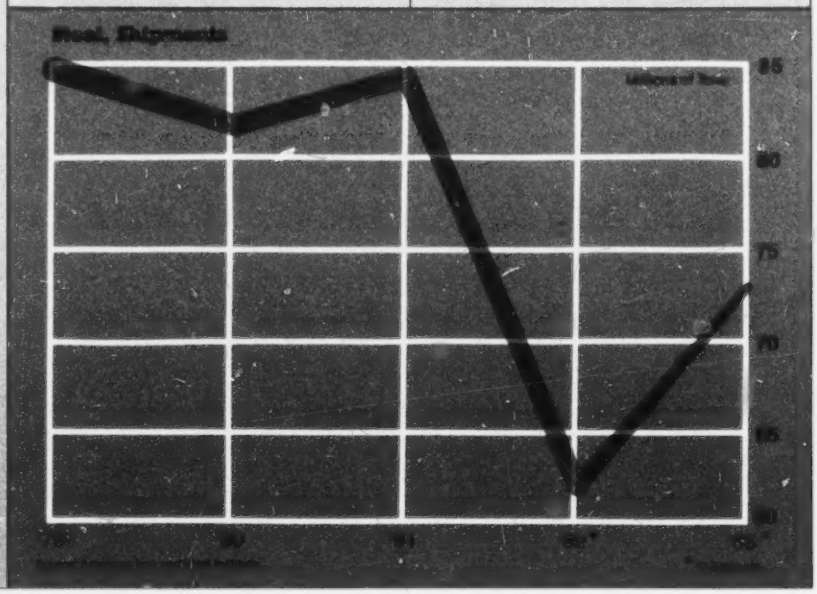
It's also worth noting that domestic steelmaking capacity is not known with great precision. In the past, domestic mill shipments have averaged over 9 million tons a month for sustained periods. For the last six months, shipments have averaged under 5 million tons a month. With furnaces and work forces pared down, the mills would probably have trouble gearing up to a sudden surge.

No one is very worried about this possibility. Foreign steel producers stand ready to offer almost unlimited quantities of metal. Until business improves, it's unlikely steel users will get excited about the strike threat or anything else.

A casualty of the recession is the steel modernization push. The steel industry spent nearly $3.4 billion on new plant and equipment in 1981. The industry came into 1982 with projects worth $7 billion.

When the market collapsed in the first half of 1982, many of the big projects were slowed, suspended or cancelled.

At best, there has been a costly delay in the modernization drive. The way it looks, a continuing financial squeeze will hold steel spending to a minimum in 1983.



Nonferrous

Some of the confidence within the nonferrous metals industries that business this year will be better than it was in 1982 can be interpreted as a conviction that nothing can be as bad as 1982 was for metals consumption, production, shipments and prices.

The rest of it can be assigned to the belief that the producers have done their part to position themselves for an upturn and the rest is up to such externals as interest rates and the ability of various segments of the consuming sector to get the ball rolling.

Metals production, be it aluminum, copper, nickel, molybdenum, zinc or lead was down sharply last year. The impact on producer inventories wasn't as dramatic as the production cuts—at least not immediately—because the industrial chew-up rate was on a parallel course. By year-end, however, the trend of inventory accumulation was reversing in some cases and slowing down in others.

Industrial consumers, meanwhile, exited 1982 the same way they entered it with inventories of production materials down to the bone and new purchases on a hand-to-mouth basis. Rock bottom metals prices, well below production costs in most cases, proved insufficient inducements to stock up, even as money rates receded in the latter part of the year because metals were not in short supply and there was no immediate threat of higher prices.

U.S. primary aluminum production last year was at a 14-year low, but the industry's inventory situation didn't improve anywhere near as rapidly as output dropped. Industry shipments were down about 9-10 pct and the general expectation is that volume in 1983 should be up anywhere from 10 to 12 pct. Top level executives are projecting a turning point somewhere toward midyear and a slow, but steady rate of recovery thereafter. That's not the sort of scenario that supports a firm rate of price recovery, particularly with industry stocks still a bit on the high side. But the producers entered 1983 with a tight rein on production still in force and they have been making noises about some idled primary capacity never coming back on stream because of prohibitive energy costs and market realities.

A big question mark for aluminum remains the international picture. Soviet bloc aluminum offerings have done their part in depressing free market prices and this metal (much of it still in London Metal Exchange warehouses toward the turn of the year) has to be moved through somebody's pipelines before the pressure is lifted.

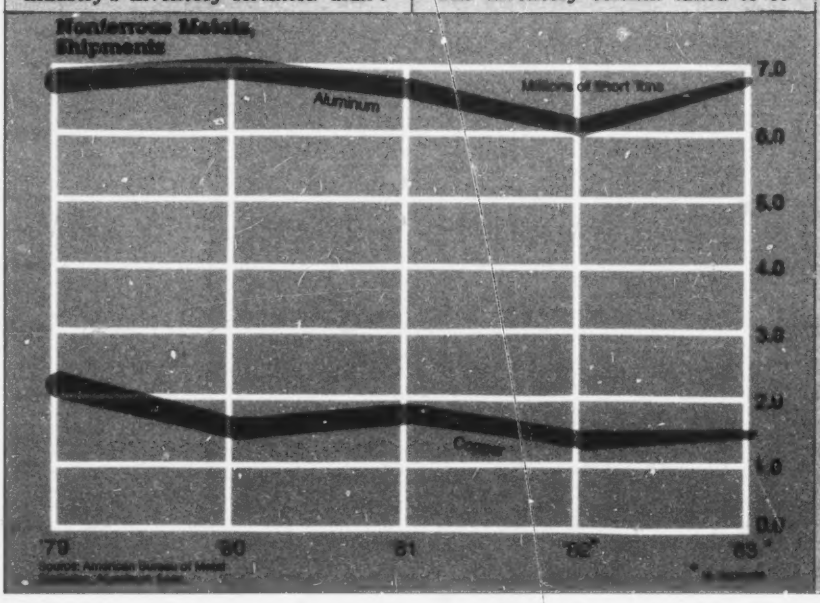
The U.S. aluminum industry has to renegotiate key wage pacts this spring but the industry's long history of labor peace usually moderates the pressure on buyers.

The copper producers also have to renegotiate their wage pacts by midyear and the copper industry usually settles up after a long strike. About the best that can be said for the severe production cutting in the copper sector during 1982 is that it kept prices from weakening further than they did. The inventory column failed to respond significantly and, toward the final months of the year, there was a nettlesome trend toward increase in copper stocks in L.M.E. and Comex warehouses while producers' inventories were largely static.

Copper consumers' stocks entered the year at minimum levels, however, which means there should be some inventory rebuilding toward the end of the first quarter—interest rates permitting. There were some faint signs of life in key consumer markets like automotive and residential construction toward the end of 1982, but it was far from robust. Copper imports were down last year, but overseas producers continued to be disinclined, for internal political and economic reasons, to slash production and there are no projections for a tightening supply of copper—for the first quarter, at least. Medium term possibilities include prospects for gradual improvement in copper consumption and a copper strike, all of which make second quarter copper sales and price projections something of a question mark.

Lead and zinc producers need a better automotive year to mark gains on a disappointing 1982. The lead companies also could use a cold winter to rebuild the replacement automotive battery market. The car companies generally expect this year will be noticeably better than 1982—again, interest rates permitting—but nobody in Detroit is talking about a boom year.

The capital goods market resides in Limbo while everyone waits for the consumer sector to reassert itself first. Which means another tough year for nickel and molybdenum. The nickel and molybdenum companies have their production schedules down about as far as they can go, which means at the minimum that inventories are being brought under some semblance of control, but revival of demand could still be some way off. The defense market started drifting under a cloud as 1982 drew to a close as Congress opened debate on the Reagan Administration's military budgets. This is an off-year as far as national elections are concerned, but the focus in Official Washington appears to be drifting toward the civilian sector—chiefly unemployment, Social Security benefits and interest policy, all of which have bearing on the purchasing power of the man on the street, who was supposed to lead the recovery last year and may be given a chance at it in 1983.



ANNUAL FORECAST

Auto

Automakers expect a slow, grudging recovery of sales in 1983. They hope to sell as many cars in 1983 as they did in 1980—6.6 million units. Less sanguine observers peg this year's total sales at 6.4 million units.

That's nowhere near the 8.3 million vehicles sold in 1979, the last of Detroit's boom years; but that's one million more than the 5.6 million total of 1982, the lowest tally since 1961.

The low-interest financing (10.9 pct) offered by automakers speeded sales during the final months of 1982. 1983 begins with a normal 60 to 70 days' worth of inventory in the dealer pipelines. Production this year, therefore, should be about the same as sales: 6.4 million.

If 1983 produces sales anywhere near these estimates, General Motors, Ford, and Chrysler each will make a profit. American Motors will edge near profitability, because its new Alliance will continue to sell well.

Volkswagen needs new products. It will introduce some in 1983, but these likely won't translate into an operating profit until 1984.

In 1982, only GM made an operating profit.

Capital spending by automakers peaked in 1981 and will continue at lower levels. After spending $9.7 billion in 1981 on plants, equipment, and tools, GM spent $7 billion in 1982. Capital spending for the entire auto industry will total $10-11 billion in 1983, according to one industry analyst.

Automakers are counting on a recovery in the U.S. economy to increase car sales. Spring traditionally sees a rise in sales, but Detroit expects the big surge to start in June.

"I think the annual sales rate," says a top auto industry executive, "has the potential of approaching 14 million cars and trucks by the end of the 1983 model year." That would mean an annual sales rate of more than 10 million cars by September. In contrast, the annual sales rate fell to 5 million in October 1982.

"I'm not making any forecasts," says another auto industry leader, "because we've been so wrong now for so many years.

"I can't believe we'd have another flat year in 1983. I think sales will be up, but I don't know how much.

Another industry executive predicts that sales in 1983 will rise by 10 to 15 pct over the total for 1982—from 5.6 million to between 6.2 million and 6.4 million vehicles.

Most analysts expect a continuation of sales incentives in the first quarter of 1983.

"Usually we expect 24 pct of our annual sales," says one analyst, "to occur in the first quarter; 28 pct in the second quarter; 24 pct at best in the third quarter; and 21 pct in the fourth. For 1983, take 2 percentage points off your usual first-quarter figure and add that to your usual fourth-quarter figure. Take one point off the second quarter and add that to the third quarter."

That would mean 1.408 million in the first quarter; 1.728 million in the second; 1.6 million in the third; and 1.664 million in the fourth quarter if sales are 6.4 million in 1983.

Machine Tools

The machine tool industry continues to limp along with lower order volumes than would have been thought possible. October of 1982 showed a small spike in new orders, but with the volumes so low, one or two decent orders could amount to a considerable percentage increase and still not indicate a trend. The year 1982 has been predicted to end with figures down anywhere from 30 pct to 50 pct from 1981. And 1983 doesn't look much better.

Many companies look for an upturn in order activity in the third or fourth quarter of 1983. All feel that it will be a slow recovery, but one which should last for two or three years when it finally gets started.

A problem for the machine tool industry is, of course, that equipment which requires a longer lead time will not even show up on '83's shipments reports. Actually, both shipments and orders in 1983 will reflect the '82 economy.

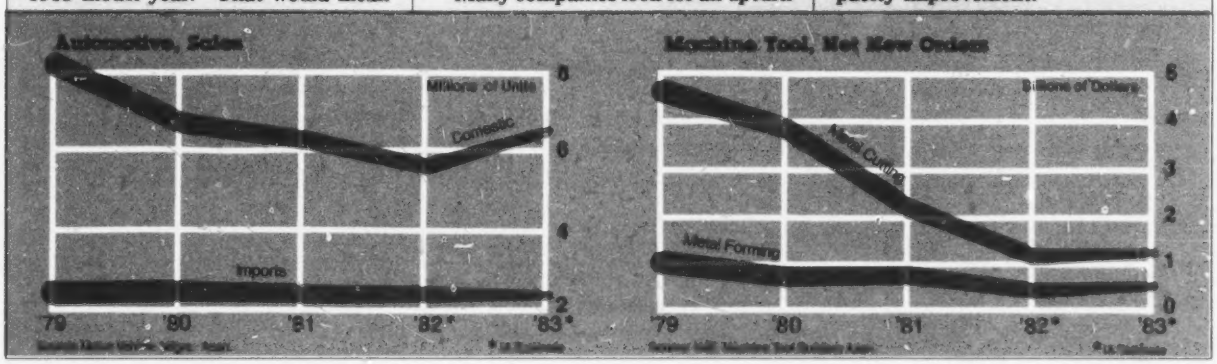
Another significant factor which will delay recovery for some machine tool companies is the backlog of Japanese machine tools in this country. Estimated by some to be 1½ years supply of smaller machining centers and lathes, these machine tools will be formidable competition—all the more so because of their immediate deliverability and heavy discounting. Some sources are predicting business failures among U.S. manufacturers that compete only in this market segment.

Current order activity is largely defense related, and defense will be the biggest single customer in '83. Defense orders were slower coming in than many hoped. There are definite commitments now, however. This could be the bright spot in 1983.

Energy, as a market, is very slow. Automotive has some programs in the works, not the volumes of the late '70s though.

Overall, the industry will not pick up substantially until an increase in consumer spending and housing triggers more capacity utilization in a variety of manufacturing industries.

When capital spending begins in earnest, the equipment most likely to head corporate shopping lists is the more sophisticated, numerically controlled machine tools. These tools have been recognized as tools to increase productivity. So, when companies have the luxury of buying new equipment, they will look for productivity improvement more than for capacity improvement.



ANNUAL FORECAST

Instruments & Controls

Instrumentation in the metalworking industries is always something of a mixed bag. Some segments are more sensitive to the economic situation than others.

Process control, for example, was down in 1982 about 7 pct from the year before; and it is not expected to pick up in 1983. An increase in order activity could begin toward the end of the year if the general economy turns before May or June of 1983, but nobody's really optimistic about that.

On the other hand, the test and measurement market was up in 1982 by 8 or 9 pct, and it should match that growth or do better next year. This is because these groups of control technology are directed toward the electronics industries and the semiconductor industries which are turning out more products and which, therefore, need more equipment.

Also, military communications and control continues to need products. If defense spending increases as is expected this sector will become even stronger.

Communications in general is a growing market. As distributed control, electronic mail, computer networks of all kinds spring up, a lot of data is being sent from one location to another. Some is transmitted over phone lines; some is hard wired. Satellites are playing a stronger role.

These communications systems require test equipment. That has been a nice little market, says one authority. Local area networks, for example, are expected to grow at a compound rate of 28.6 pct for the next six years, and they represent just one segment of this communications explosion.

The increasing dependence on microprocessors spurs sales of logic analyzers and microprocessor development systems. All these things add up.

Other than these areas, however, the outlook is pretty bleak. Growth in 1983 should be about 2 pct over 1982, bringing shipments to just over $20 billion.

Many user industries had started to upgrade facilities before the economic slump worsened. And many had plans to do more retrofit. However, when business dropped, these companies closed inefficient plants rather than remodel them. And a lot of control orders died in those plants.

Exports in control instrumentation remained fairly constant in 1982 over the previous year because the test and measurement group was strong. In the export area, process control instrumentation was down 9 pct, analytical instruments down 4 or 5 pct.

The dollar is starting to weaken, however, and exports may be better in 1983 if the dollar weakens a bit more over the next six months and stays there. Exports usually run about 25 to 30 pct of total shipments.

Computers

The recession has affected the growth of the computer industry shipments in 1982, not just domestically but worldwide. And 1983 is one big question mark.

Some sources believe the domestic economy will pick up around the middle of the coming year and that should bolster shipment figures. But the economies of Europe don't seem close to a turnaround, and the foreign market accounts for about 30 pct of the U.S. computer industry business.

In other words, even with a stronger domestic economy, 1983 will not be a great year for the computer industry.

Shipments will be up in 1983 to almost $40 billion dollars, a growth of about 14 pct. But for an industry that expects the higher percentages it has become used to, 13 or 14 pct is a slow year.

The bright spots are the personal computers and the 32-bit minicomputers. And that should continue to be the picture for the next year.

In general the minicomputer industry is flat because of the lack of OEM activity. Even the market leaders in this segment have had less than historic growth in revenues and earnings this past year. The superminis, however, seem to be growing and their growth is expected to continue.

Personal computers are strong because of their low cost and because of the wide range of software now available. A few years ago software was lacking. Now, however, with two years of experience with the small businessmen and the educational sector, both the manufacturers and the independent software houses have developed numerous packages.

That seems to have stimulated a fairly substantial rate of growth in that end of the market, according to one source.

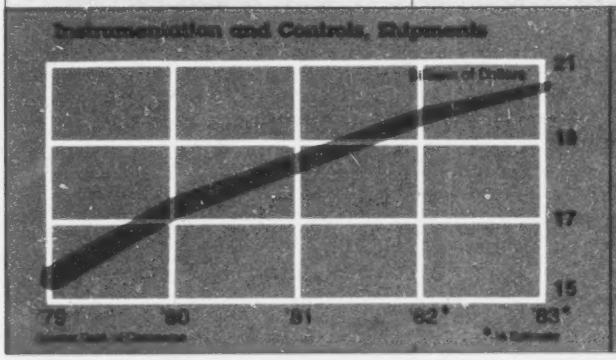
Growth in this market segment may be stimulated further by Japanese entries. If they succeed in dropping the price of personal computers as they have in other technological developments, the home consumer market could explode.

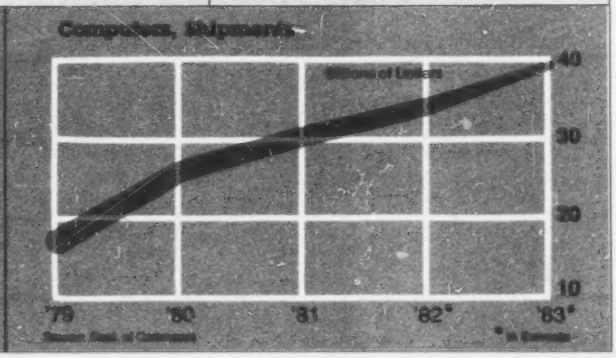
What has slowed the Japanese entry so far has been the lack of expertise in applications software and lack of distribution channels.

Another indication of the state of the computer industry is the layoffs which have been required by many companies this year. Layoffs are not common in this area.

Still, there is growth, and growth will continue over at least the next five years. One source predicts a compound growth rate of more than 16 pct over the 1981-1986 period, more than doubling in value from $29 billion in 1981 to $62 billion in 1986.

By 1986, this source says "desktop computers will account for 29 pct of the value of all worldwide computer shipments, second only to general purpose computers which will hold on to 40 pct of the market."





ANNUAL FORECAST

Metal Coatings

Shipments of metal coating materials, especially OEM product coatings, continued their downward slide through 1982. By year's end, the slippage amounted to close to 10 pct from 1981 shipments.

In gallons, the 1982 total should wind up around the 275 million gallons shipped—about 25 million to 30 million gallons under 1981 figures.

For 1983, the feelings are that there will be little, if any, improvement—and if so, at least not until the third or fourth quarter. As one coater put it: "It appears that we'll be bouncing along a rough bottom for most of 1983."

The business outlook in other industries determines pretty much what the outlook of the paint industry will be. And as long as the automotive, farm equipment, off-the-road vehicles, appliance and other industries of this magnitude remain in the economic doldrums, the coatings industry is not likely to prosper.

It should be pointed out, too, that paint application methods and equipment are becoming more efficient so that the paint shipped to OEM product plants is covering much greater surface areas.

The pattern is very much the same with precoated aluminum and steel. Shipments of coil coaters earlier in 1982 had slipped by slightly more than 13 pct—with the slippage being slightly more for aluminum than for steel.

The industry attributes much of its current loss in shipments to slowdowns in the large consuming industries such as transportation and building products. Some slippage has also occurred in coated steel usage for preengineered building, rural building products and appliances. The one bright spot has been the increasing acceptance of weldable zinc-rich primer coatings by the auto industry.

Plastics

Considering the country's economy being in a severe decline, plastics have fared relatively well compared to other major industries. The 1982 figures of resin sales and captive uses, at last count, were running only slightly behind those of 1981 over the same span of months.

Plastics producers are already enjoying a better economic outlook than many of the industries they serve. Yet, they look to good growth just as soon as any of their major markets make a turnaround—as for example, housing, automotive, transportation and packaging. Packaging, in fact, has become a major segment for plastics, accounting now for about one-fourth of total consumption.

Despite the general economic doldrums, plastics producers have high hopes for 1983. They look toward to new and expanded usage of plastics by the automotive industry. Also, they anticipate added growth in some of their large-volume commodities.

Many plastics producers view the current recession as simply a slowdown in their growth rate—something temporary.

Reinforced plastics, too, were off in 1982 by about 9.5 pct under the 1981 figures. The year-end figures for 1982 should round off to about 1.75 billion pounds at the final count.

Almost all types of reinforced plastics were affected by the slippage. Yet, despite this, there are some hopeful signs that may help the industry to have a 1983 that will be no worse than 1982. Aircraft, for example, although still a relatively small market, is moving ahead. Construction has slipped but there's been enough of a spark to lend some encouragement into 1983. And the hope in the automotive industry is in new parts that reinforced plastics have picked up from competing materials. In construction, concrete forms of RP are gaining.

Fluid Power

Fluid power, despite its slip in 1982 sales, could push ahead again in 1983 to a $5.4 billion year—about an 8 pct gain in an industry that dropped nearly 15 pct this past year.

Nevertheless, most industry members are cautious about their 1983 forecasts. They range from no gain to 10 pct in added sales.

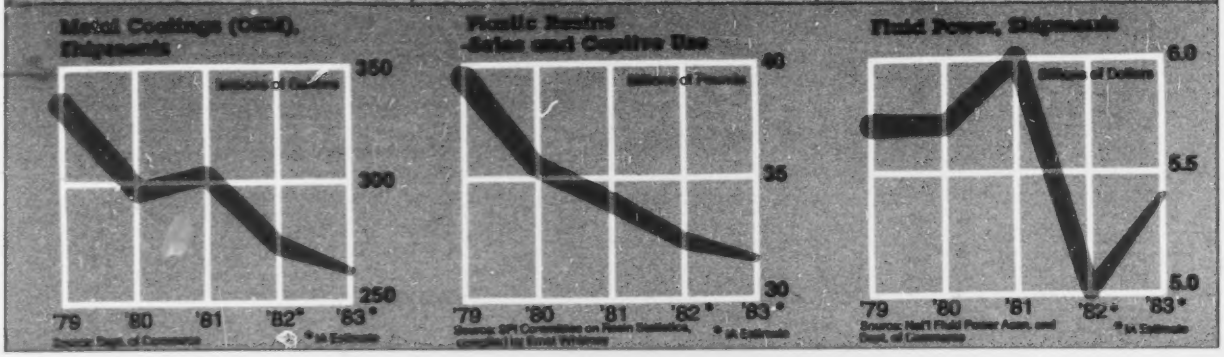
In the current climate, optimists are a minority group. Most forecasters say that part of the gain they expect during 1983 is due to new product lines that will help them penetrate some new market areas, while some of their regular lines will continue to hold even or show a small gain.

Fluid power, whether pneumatic or hydraulic, spans a number of markets, from OEM to the replacement markets. It also (because so much of the output of the industry is used as components) is something of a leading indicator.

There are some signs that are a little more positive. Autos, especially the front wheel drive units and light trucks, have been showing some gains already in 1982. This trend is expected to continue into 1983.

Another, more heartening sign is that at least a few suppliers of fluid power components to the capital goods builders who serve the auto industry now say they expect their business, even the machine tool segment, to pick up during 1983.

The big mobile markets, farm and construction machinery, aren't going to be much help in 1983. A gain in this sector in sales dollars for fluid power components will hit late, say the market observers, and not show much more than 2 pct to 3 pct gains. Materials handling equipment and mining equipment are also getting poor reviews at this early stage, even though some fluid power suppliers say they've done fairly well in coal mining machinery markets this year.



ANNUAL FORECAST

Construction

Hope springs eternal. Despite a 30 pct decline in construction machinery sales in 1982, the industry is beginning to talk about a possible 8-10 pct recovery in sales in 1983.

Although this is only a prospect, it still signals a very grim first half. Sales of construction machinery (including mining and cranes), slipped from $17 billion in 1981, to about $12 billion in 1982. It would have been deeper, but backlogs of previously ordered export machinery kept some U.S. plants working at a fair level into early 1982; and some were still holding up through second quarter, though by that time both foreign and domestic new sales were plunging.

The problems in first half 1983 will still be unsold field inventory. Some unpublished surveys already show a moderate strengthening of opinion about the 1983 building outlook at both the distributor and manufacturer levels.

A strike at the nation's biggest construction machinery builder, Caterpillar Tractor Co., had already cut off output at its dozen plants in the U.S. for a two-month period. While the company and the UAW are back at the bargaining table again, it is possible that a total three months of production from this industry giant have been written off.

All builders of construction machinery have been cutting back production since late 1981. But, sales have been falling as fast, and sometimes faster, than production cuts.

There's also been a wave of dealer closings that has thrown the equipment they were carrying back into either the manufacturers' hands, or out into the cut-rate pricing market.

Construction equipment builders won't do much to raise manufacturing rates during the first half of 1983, concentrating instead on further inventory cuts.

Farm

The projected recovery in farm equipment sales, as measured in retail tractor sales, may look better than it really is.

The key indicator, wheeled farm tractors, should advance about 8 pct in 1983, over a very bad 1982 showing.

The number looks better after the disastrous slide of 1982 in tractor retail sales, which dropped to the lowest figure in decades.

But the problems that are weighing down farm purchases haven't been solved, and pinch on farm cash is still brutal.

The big, high dollar value equipment, star performers of farm equipment builders for a decade, are still stuck in low gear.

The same problem plagues harvesting combines. Where heavy tractors fell about 30 pct in 1982, combines were down more than 40 pct by fourth quarter and were still slipping.

The fire sales of third quarter have, if anything, accelerated as builders and dealers scramble to unload more equipment. A lot of equipment is still sitting in the dealer yards.

There are some exceptions to the dire forecasts. Forage equipment has been running better for some months. This is expected to continue into 1983 with some types of forage-related machines getting a sales boost of 20 pct.

The real upturn in manufacturing isn't expected until plants begin to build for the 1984 market season. That could trigger some new production as early as September.

The inventory problem continues to be mainly at the dealership level. Manufacturers have cut their components inventory, have closed or furloughed plants and laid off workers. Some continue to report they'll manufacture at a lower rate in 1983 first half than they did in 1982, which is normally the peak factory period of the year.

Mining Equipment

"Right now, we don't even feel like we're in business," says one mining equipment company sales manager. "Sales are really rare."

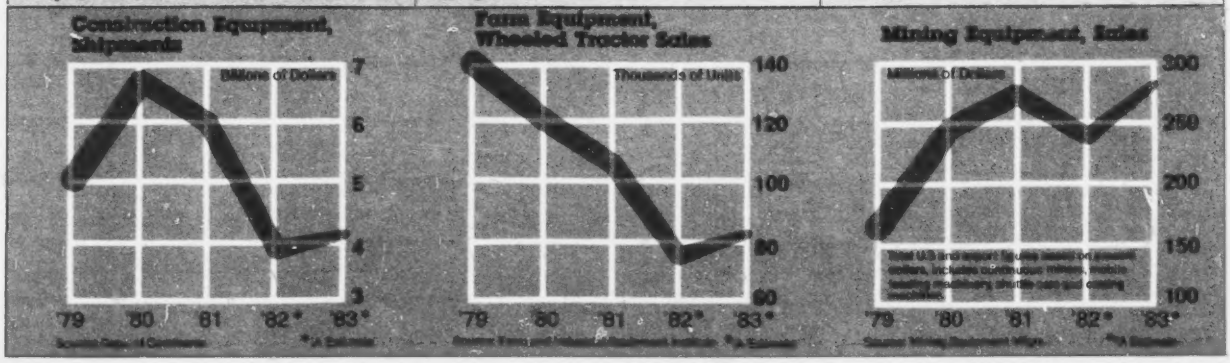
Others in the industry express similar pessimism. "We can't see this thing turning around for at least six months, maybe more," says one.

Mining equipment is not only very expensive in itself. It also is used in extremely expensive ways. A new mine or a mine to be restarted is a matter of millions. "So when you talk about costs in this business, you're talking interest rate points," says one company's financial man. "We don't expect some segments of the equipment market to recover at all in 1982. Copper, for example, may not show much activity at all in 1982. Iron ore should see some increased activity by the second quarter."

If there's any hope for mining equipment manufacturers, however, it's where it's always been. "Coal is where they look for gold," says an industry expert. Coal mining, while hardly booming in 1982, hardly collapsed either. "The coal mining industry could be doing quite well by mid-'82," he adds.

Equipment for the coal mining segment has held up fairly well and may show some good growth in 1982. Utilities expect coal to remain the basic power-generating fuel for decades in many parts of the U.S. particularly with the country's nuclear power in dustry practically dormant. "We see that as a source of long-term optimism for our industry," says one mining equipment industry leader. "We see the first half of 1983 as a repeat of the last half of 1982, but we expect some really significant growth beginning mid-year," he predicts.

"If predictions about the prime staying down are true," he adds, "we might safely predict an increase of 8 pct above 1982 for the whole domestic market."



ANNUAL FORECAST

Material Handling

Material handling companies are more than cautiously optimistic about 1983. "Why be cautious or guarded about optimism?" says one. "We expect 1983 to be a very good year for most of what we make and that includes lift trucks."

Lift trucks have not been moving very well for months. However, some industry sources have noted that there have been signs of a turnaround in that segment of the material handling market. "We've seen an increase in inquiries in the past few weeks," says one.

Larger systems makers also expect 1983 to finish well ahead of 1982. "Worldwide, our kind of product is a growth industry. All we need is clear evidence of a lasting recovery and we'll be busy beyond belief," says an industry leader. He expects capital spending to revive across the board in the U.S. by mid-83 and is boldly and openly optimistic about the material handling industry's future.

The steady decline in interest rates has also increased the hopes of managers in the industry. "At some point it will become clear to large and small business that now is the time to buy. We believe that point will be during the second quarter of '83."

Others in the industry agree that 1983 could be a very good year, up perhaps as much as 20 pct over 1982 in constant dollars. There is some cautious pessimism however in terms of the deficit. "The $180 billion we'll owe ourselves is not good, but if the economy turns around even modestly that number could shrink dramatically," notes one large systems maker.

"Personally," adds another industry source, "I think we're going to see the long-awaited capital goods boom begin some time after the first half. That means I'll also see the beginning of the long-awaited material handling boom as well."

Appliances

The consensus is that major appliance sales during 1983 will approximate 1982 figures. Some optimists, however, are predicting unit sales improvements in the range of 8 pct.

The pessimists, noting the fall-off of factory orders and growing unemployment, believe much of 1983 will be stagnant. The optimists, eyeing recent increased housing starts and some pickup in consumer spending, and believing interest rates will continue to drop, see some positive growth in 1983. No one is predicting a banner year.

Housing permits and housing starts have risen during the past several months. Appliance sales will jump when these houses near completion. Retail sales which have been sluggish since June, began to perk up in November and indications are that this strength is carrying into early December.

"With some consumer strength appearing at the end of this year, the economy appears to be stablizing; and with a fairly level economy, less impetus from the consumer will be required to start the economy up again," said one industry official.

Although finishing strong, the number of major appliances sold in 1982 will fall some 6 pct below 1981 sales figures.

October shipments of major appliances were slightly greater (0.3 pct) than shipments for the same month last year. This is the first month to show an increase in shipments over the corresponding month of the previous year, since August 1981.

The pickup was spearheaded by microwave oven shipments which were up 8 pct over October 1981 and the largest total for any month on record. Sales gains for the month also came from refrigerators, electric ranges, food disposers and dehumidifiers.

Oil Country

The upcoming year is going to be a "washout" for the oil country tubular goods (OCTG) industry, comments a major pipe distributor. He believes the industry at best can look forward to a tepid recovery occurring sometime in the second half.

In short, 1983 is not going to be too much unlike 1982, a year in which U.S. OCTG shipments nosedived from 4.2 million tons to an estimated 1.9 million tons. If this estimate is on target, it will mark the first time since 1976 that annual OCTG shipments have fallen below the two million-ton mark.

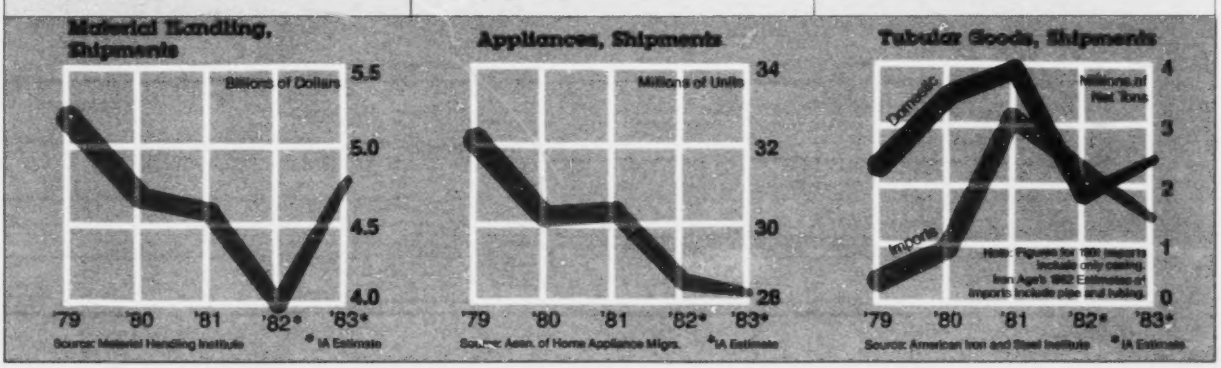
The source of much concern in the industry still remains the large inventory overhang. Current estimates have put OCTG inventory in the range of 4.5-5.0 million tons, or double the needs of the oil and gas industry. A more desired inventory level, industry members note, is 2.2 million tons.

Another source of great concern is OCTG imports. For 1982, it is estimated that imports, particularly from Japan, will have out-distanced U.S. shipments by 200,000-300,000 tons. Import penetration in the U.S. market was so great in 1982 that at one point (August) imports accounted for 516 pct of total net shipments. Imports are beginning to slow somewhat, industry sources say.

What does all this mean for the OCTG market in 1983?

The news is not good. Said one major producer, "The first quarter will be a continuation of the fourth quarter for us. Right now we're hardly even operating. We only open our doors when we get a few orders." There will be little or no buying in the first quarter, but activity will pick up in either the second or third quarters, he said.

The OCTG producer believes that U.S. mills shipments in 1983 will total 2.9 million, and that imports will drop to 1.5 million tons.



ANNUAL FORECAST

Castings

The castings industry will begin to show a recovery in 1983 after a disastrous 1982, which saw operations drop to perhaps 40 pct to 45 pct of capacity, on estimates by the Iron Castings Society.

Foundry managers say that gray and ductile iron castings will lead in the 1983 recovery, with about a 7 pct advance. That means the industry should ship about 9.1 million tons of ferrous castings, versus a very low (and revised downward) total for 1982 of only 8.5 million tons. It is estimated that the steady decline in castings output in the past three years has probably cut castings capacity by at least 2 million annual tons.

To say the least, a recovery is badly needed; but the recovery isn't expected to be a strong one.

There has been some stirring of new business in the consumer durables area. Castings aimed at appliances, refrigeration and air conditioning, and even passenger autos, show some signs of gains for January even though nobody expects much action in the first quarter of 1983.

There has also been some action in the truck and engine market. Light trucks have been performing better than expected, but now a few reports are coming in of gains in over-the-highway trucks and the castings that go into them.

Buyers of castings in large quantities are beginning to concentrate on fewer castings suppliers. This has concentrated some of the available business in the larger foundries.

The nonferrous outlook is equally troubled. A very poor first quarter of 1983 is in the cards for both aluminum and copper-based castings and the whole first half looks very slow. The best bet is that the second half will see a recovery, but it will still show very little gain in pounds of castings shipped over the 1982 year.

Forgings

Saying that the forging industry is depressed is putting it mildly. Forging facilities are at present operating well under 50 pct capacity. These low operating rates should continue through much of 1983.

Industry sources project 1982 sales of custom impression dies at $2.3 billion, down 21 pct from 1981's $2.9 billion. Bookings for the year will approach $1.4 billion, a 43 pct fall off from 1981.

For 1983 shipments are projected at $2.2 billion and bookings at $2.0 billion. Thus, projections for 1983 show shipments of closed die forgings running slightly below 1982 figures, but orders should increase, especially toward the end of 1983 as excess inventories finally dissolve.

Despite possible increases in orders, few forging producers are optimistic about 1983. A number see 1983 as a year that will be at least as bad as 1982. "We are just going to try to hang on," said one industry executive, "for we see little to be optimistic about in the coming year."

According to one spokesman: "Continued softness in key markets—aerospace, automotive, off-highway and agriculture equipment—is anticipated for at least another year. Newly added to the list of weak markets is oil field exploration and drilling which slowed down drastically in early 1982."

Military spending is on the increase, but has yet to be felt to any significant degree by most forging operations.

Open die producers are faring little better than impression die manufacturers. Shipments for 1982 are projected at $925 million, down from 1981 totals of $1.1 billion. Bookings are pegged at $700 million, a drop from $1.2 billion in 1981. Shipments for 1983 are estimated at $835 million and bookings at $665 million.

Heat Treating

Industrial heating equipment manufacturers and the commercial heat treaters are showing the effects of the strong economic tide working against them.

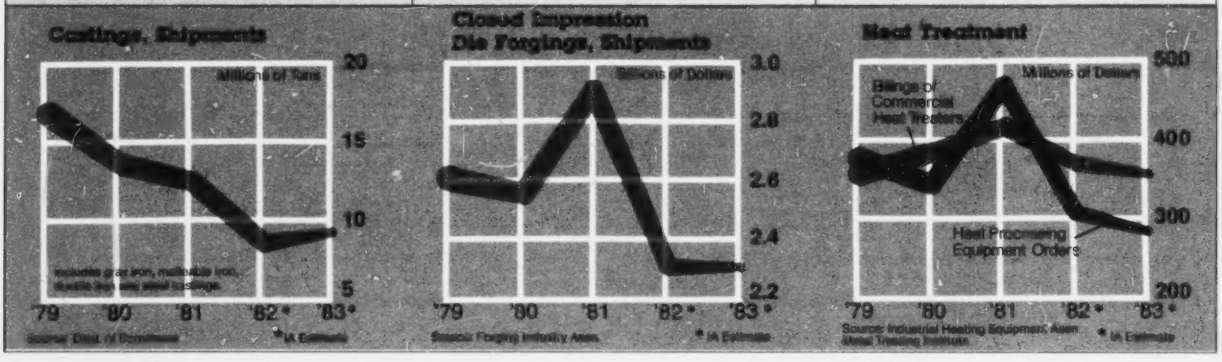
Domestic orders for heat processing equipment are expected to show a drop in 1982 of about 35 pct from the 1981 figures. However, the 1981 figures had rebounded very strongly from the previous year which gave the heat processing equipment builders an exceptionally good year.

The slippage in domestic orders for heat processing equipment is expected to continue through 1983, but not nearly at the rate in 1982. Many manufacturers, in fact, anticipate an increase in domestic orders. At the same time, a smaller number expect a further slide in domestic orders—and believe the slide will be a significant one. Overall slippage in orders for 1983 is being estimated at about 5 to 6 pct, but still a great improvement over 1982 if it materializes.

There are still major concerns over high interest rates and high fuel costs. Modernization of plant equipment has not and is not taking place as in past recent years. In fact, trimming of expenses is taking place in every quarter.

The commercial heat treaters have not fared much better. For the first nine months of 1982, figures showed them to be more than 11 pct below their 1981 level for the same period. Moreover, there's little optimism for their business outlook in 1983. Cautiously, they add, at least not until the third or fourth quarter.

The major area of hope for the commercial heat treaters is a turnaround in the industries they serve—automotive, earthmoving equipment, farm implements and energy. As for each individual heat treater, the outlook will depend on the particular industry he serves. Perhaps the least affected areas have been aerospace, high technology and defense.



ANNUAL FORECAST

Aircraft

Industry analysts look for the aircraft industry to improve slightly in 1983, but that's little solace for an industry that has nowhere to go but up after a dismal 1982 performance. New aircraft orders plunged by nearly 60 pct in 1982, with Seattle-based Boeing, the industry leader, watching new orders fall from 219 in 1981 to 60 for the first 11 months of 1982.

Only the military side of the equation improved. McDonnell Douglas, for example, was unable to sell even one DC-10 jumbo jet this year, but the production line kept rolling, thanks to the U.S. Air Force's largesse in ordering 10 KC-10s, an advanced tanker/cargo aircraft derivative.

At Boeing, U.S. government sales totaled $2.4 billion during the first nine months of 1982, up $891 million from the 1981 comparable period. Similar business growth is projected for the foreseeable future.

Officials like T. A. Wilson, the Boeing board chairman, blame the soft economy, high interest rates, tough competition resulting in high discounting and unfavorable tax provisions for the industry-wide slide. The airline companies are competing more aggressively for fewer passengers, with poorer profits resulting and little money available to purchase new equipment.

That hard cycle should continue in 1983. The International Air Transport Association predicts record financial losses for the industry worldwide in 1983, with airline deficits expected to approach $2.1 billion.

But a flurry of new equipment orders in the fourth quarter holds out some hope for a slight recovery in 1983. "We see the beginning of an upward trend for the airlines," said one analyst for McDonnell Douglas. "October traffic was very encouraging. Perhaps we're coming to the end of the line here in this recession."

Engines & Turbines

The broad-ranging engine and turbine industries are being very conservative in their forecasts for 1983, as 1982 ended far below projections.

Manufacturers of engines for construction equipment, however, are hoping for some improvement this year. Increased housing starts and possible road repair programs could mean more orders. Says one producer: "The front-end loaders, air compressors, pavers and other maintenance-type equipment don't look too bad. But I expect the big stuff won't come back through '83."

Oil field and farm equipment demand probably will be low, but politics could change either situation overnight. Producers are working under the assumption that won't happen, though. Large turbine generator sets for long-term projects continue to point downward as the power industry contracts and nuclear plant business nearly halts.

A number of manufacturers point out that orders began to pick up in the normally slow fourth quarter. They're hoping it's a sign that an upward trend is beginning, even if it's a painfully slow one.

Order books generally were slim going into the new year. Some companies took extended shutdowns hoping to accumulate some business for first quarter production.

Most producers questioned by *Iron Age* say the drop in interest rates has helped to boost orders but that buyers are still cautious. While some customers may be holding out for still lower rates, manufacturers are concerned the rates may only go up again in the months ahead.

The dollar's weakening late in 1982 may mean some pickup in export business in 1983. The currency's strength throughout most of 1982 just about killed all interest from foreign customers.

Welding

Many executives in the welding industry are breathing a sigh of relief that 1982 is history. Compared to the previous record-breaking year, 1982 was a near disaster. Shipments, including gases, plummeted from a high in 1981 of $3.6 billion to $2.5 billion, or more than 30 pct.

Several industry spokesmen say that the worst is over, and that business is showing signs of picking up again.

The recovery is anything but dramatic; at best it's very, very slight. Others are predicting a continuation of the disastrous fourth quarter and no noticeable pickup until the third quarter of this year.

All in all, *Iron Age* sees 1983 as a slight improvement over 1982.

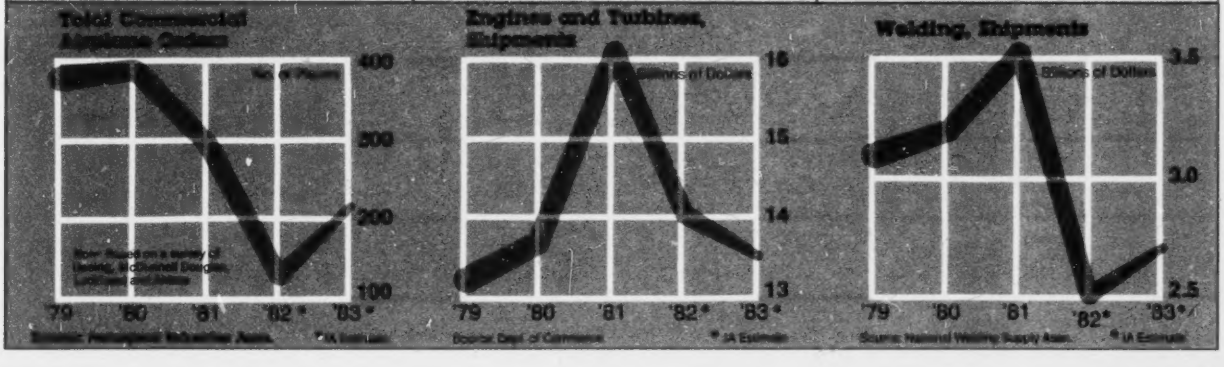
Actually, welding could have a very decent year if certain events were to take place. One is the weld repair work on highway bridges. Another is the startup of defense construction. In addition, this could be the year when things start going in the energy industry.

Despite the fact that the bread and butter items—the welding machines and electrodes—have not been doing well at all, the high technology products have been going great guns. An exception here is the arc welding robot, though even here it may be just a matter of time before robotized arc welding makes a big splash in this country.

According to the statistics compiled by the National Welding Supply Association, Philadelphia, welding shipments hit a high during the third quarter of 1981 and have been coming down ever since.

"Nobody is making any money," says one executive.

"We're finding out that some of our biggest customers are saddled with huge inventories, but they are also operating in the red," he adds.



ANNUAL FORECAST

Fasteners

"We don't see it." That's what one fastener maker says in answer to the predicted end of the recession. "We don't see it at all."

By and large, mechanical fastener companies in the U.S. see a continuing series of less than spectacular business days even if 1983 is a boom year. "Our problems are not just matters of domestic economics. We're getting killed by imports," says an industry source.

"There's no way we can compete with this dumped stuff," says another.

Some types of fasteners are almost entirely imported now. For the whole U.S. market, the import figures hover around half of domestic consumption. And, it's growing.

Yet, certain companies in the business are not nearly as worried about 1983. Those who have largely left the "standards" business and make "engineered" nuts, bolts and rivets expect 1983 to be significantly better than 1982.

Manufacturers of specials, or engineered fasteners expect the aerospace market to remain a major source of business in 1983.

"We also expect to see some growth in capital goods by mid-year," says one specials maker. "It looks like the domestic market for specials might total as much as 8 pct above 1982. But I don't expect the first half, certainly not the first quarter, to be anything different from 1982."

If there is a sustained industrial recovery in 1983, many of the companies in the engineered end of the fastener business will do well. Companies that are heavily dependent on the standard nut and bolt business have no such expectations, unless there is some action on imports.

Already, scores of U.S. standard fastener makers have left the business. Many more are expected to follow if the import flood continues.

Screw Machine Products

Government analysts are envisioning a 3 pct current dollar growth for the screw machine products industry in 1983. Industry sources are more optimistic and believe the figure could approach 10 pct.

Whether the 10 pct figure can be reached depends on how rapidly the economy picks up in 1983. If the economy waits until the tail end of 1983 to strengthen, the screw machine products industry's usual slow response to an upturn may push an industry recovery into 1984.

"The screw machine products industry traditionally comes out of a recession slower than other industries," says one official, "so while slight growth is predicted for many industries in 1983, the screw machine products industry may have trouble improving much over 1982 figures."

Counters another official: "Recovery for the industry should be more immediate this time around because inventories in comparison to other recessions are very low right now."

Others are also optimistic about some recovery in 1983. "There are several potential growth areas for the industry in 1983, areas such as office, electronic and medical equipment, computers, and military components," remarks one industry source.

If improvement does occur in 1983, it will probably be very gradual and will take place in the second half of the year. All indications are that the last quarter of 1982 and the first quarter of 1983 will be very poor. October orders slumped from a poor September, and early indications are that November and December will be even worse.

"In order for industry to follow the predicted scenario of poor first quarter in 1983 followed by a so-so second quarter and gradual pickup in the second half, interest rates must continue to drop," explains a source.

Stampings

Stampers are expecting a slightly better year in 1983 than 1982, but business will continue to lag far behind recent years. Some businesses reported a bit of activity in the third quarter of last year, but said it then dropped off in the fourth.

The more optimistic in the industry expect some improvement in the middle of 1983's first quarter. Most, however, look for little change until the third. Those tied to the diesel engine market are being "damaged severely" by the Caterpillar strike, according to one Midwestern stamper. But there's some hope, he adds, with a recent employee callback at Cummins Engine.

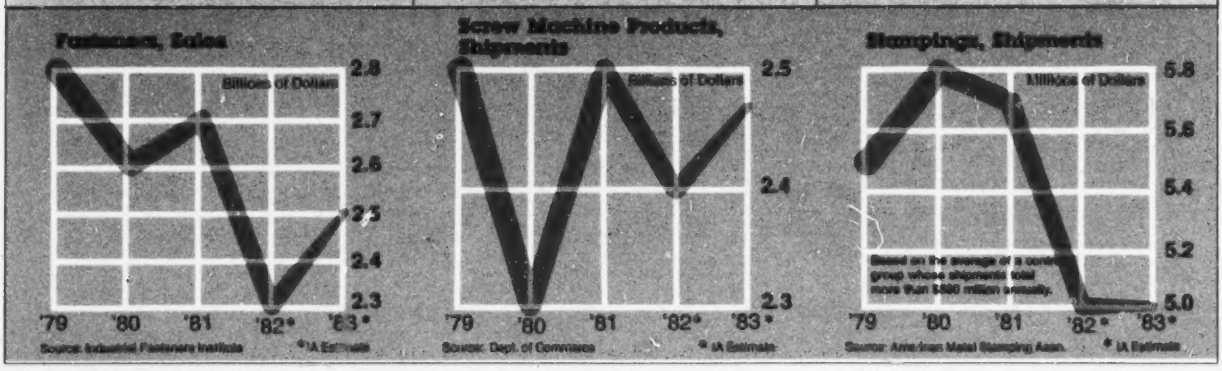
Stampers, for the most part, are carrying very little order backlog into 1983, and that's a problem. Says one Northeastern executive, "We're taking orders today for stuff we'll ship this month."

Everyone's looking to housing as a signal for better times ahead. A stamper who depends on orders from appliance makers says he's seen only a "flicker" so far.

A fellow stamper, in the plumbing market, says housing starts are up but business won't improve until there is more buying "by the people who choose to buy houses, not just the ones who have to." His inventory is at a minimum, but he's trying to "increase it 15 to 20 pct to accommodate the random buying and hold onto my customers."

Most agree that consumers are not going to start buying until they feel more comfortable about it, "when there are fewer people unemployed or insecure." Interest rates are still an area of concern, as most stampers feel they won't drop down much further.

One executive's prognosis: "Sales should be up, but volume will be less than in the 1970s. The 1979-80 period will be the best until 1984 in terms of volume."



ANNUAL FORECAST

Bearings

A forecast from the Dept. of Commerce puts current dollar growth for the antifriction bearing industry at 10 pct (4 pct real growth) for 1983. But according to bearing manufacturers, any increase in 1983 sales will be to distributors who service the aftermarket and not to OEM manufacturers.

"We see no signs the construction equipment industry will grow in 1983," said one bearing producer.

"Farm equipment and the machine tool industries are not going anywhere," reported another. "Aerospace will also remain depressed. We are getting some increased orders from the military but they are not nearly enough to offset the continuing lack of commercial orders."

According to officials, military orders are not going to have a major impact on the industry but should increase steadily through 1983.

Sales to the automotive industry will probably be up slightly next year.

"Besides seeing fewer sales next year we are feeling increased pressure from overseas bearing producers who are concontrating on the still large U.S. market now that local markets are depressed," said one manufacturer. "At present some 16 pct of the bearings consumed in the U.S. come from overseas."

With the probability of a stagnant 1983 OEM bearing market, manufacturers see some hope for sales increases in the aftermarket. "I think there will be steady small growth in that area next year," remarked a spokesman. Bearing distributors were hit badly in 1982 but have inventories in order at present and should do better in 1983.

"One problem is that many of the major OEM users have shut down many of their plants," reported a bearing manufacturer. "A number have been closed since mid-November and won't reopen till mid-January."

Valves

Valve makers have little to smile about, and the only ones with anything to grin about at this time last year—those in the oil patch—are crying the loudest now.

The outlook for the industry in 1983 is for continued slump. Interestingly, the order of which markets are best and worst seems to be switching. The AWWA municipal market suffered badly for the last year and half, but things are looking up. One marketing man says quotation activity is strong, and he figures customers wouldn't expend the effort and dollars to ask for bids if they didn't intend to execute some projects.

"Also, some companies getting bids are asking us to extend validity for 90-120 days hoping interest rates will drop a little more," he adds.

Those in the traditional multi-turn market are hardest hit, but even quarter-turn, butterfly and other producers of specialized, highly-efficient valves are feeling the pressure of the general economy. Maintenance work comprises most of the business these days, as projects are few.

One Eastern executive in the automatic control valves and regulators business says, "If anything happens in the second half of '83, we'll be happy, but we're not banking on it." He says industrial business is way off, and his company's numbers are boosted only by defense orders.

There have been massive layoffs in the oil patch. The bottom fell out and those valve makers specializing in the field took a beating. Says one valve maker *not* in the oil patch, "If the oil glut sticks around, there should be some good acquisition candidates around in that business."

Valve makers enter 1983 with slim order books, requests coming in only sporadically and for fast delivery. Foreign competition has established a beachhead, with a 40 pct share.

Gears

Gear manufacturers wrapped up a worse 1982 than anticipated, and so are cautious in their forecast for 1983. Most expect little improvement in light of the industry's tendency to lag the economy by six to eight months.

The only thing that saved 1982 from disaster for all was demand from the oil field sector in the early part of the year. But, as one executive put it, "Then the oil field collapsed and nothing else came up." There's apparently quite a bit of inventory still around as gear makers were caught unawares by the drilling dropoff.

A Midwestern executive whose company has a varied product line pointed to "slight movement" from construction, underground mining and paper/pulp customers, but "nothing indicative of a trend."

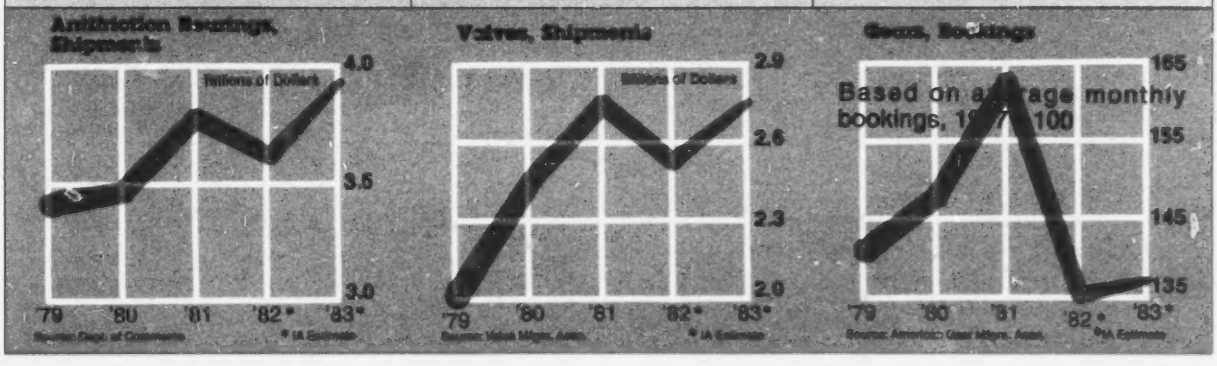
Apparently a number of gear manufacturers are considering a pursuit of military contracts. The red tape and fear of the "bandwagon" effect may scare off all but those already firmly entrenched.

Nearly every manufacturer surveyed has experienced cancellations because of capital spending cuts. Few expect that any business generated by the 5¢ gas tax-public works program to have an effect on 1983 figures. There is some hope that construction may recover a bit.

The industry is increasingly feeling the heat from foreign competitors in West Germany, Finland, Japan and Taiwan. It's affecting the industry across the board, from enclosed gear drives to fairly large gearing.

There is concern that order backlogs, which kept some firms alive in '82, are quite low. Some smaller firms are actually hoping customers will delay or stretch out orders.

One spokesman summarized the outlook as "sputtery, an odd order here and there, but no trend."



ANNUAL FORECAST

Shipbuilding

"The Navy is our only hope," says a shipbuilding expert. Truer words were never spoken.

The program to upgrade and enlarge the U.S. Navy is underway and picking up steam. But governmental budget battles have hobbled it a bit. And any full impact of the Navy rebuilding program in terms of substantial jobs and work is two or three years away. It takes a long time from Congressional funding before a keel is actually laid.

As far as merchant (commercial) ship construction is concerned there is virtually a void. And shipyards which can't get involved in Naval construction, rebuilding or repair face the very real prospect of going out of business. What's more, there's much bitterness among shipbuilders that, despite the President's promises to stimulate commercial shipbuilding (made during the 1980 campaign), they have been left out to dry.

A spokesman for the shipbuilders declared last fall, "Notwithstanding the unequivocal statements made by Mr. Reagan, there is no visible policy momentum to assure that 'our vital mobilization base is preserved' with a throughput of 'sufficient naval (as well as) commercial shipbuilding.'

"These are the President's phrases," the spokesman added. "In what can only be viewed as a deliberate contradiction of his declared intentions, the Dept. of Transportation, with an unrepentant assist from the Maritime Administration, and some members of Congress, is openly encouraging the construction and repair of merchant vessels in foreign shipyards to take advantage of the non-free trade, below-cost pricing, state-supported practices of other shipbuilding countries."

Only three new orders for commercial vessels of large size were placed in the first ten months of 1982. And as commercial shipyards exhaust their anemic backlogs the number of ships on order or under construction continues to plunge to the bottom (see chart). The auxiliary work that U.S. shipyards, not engaged in Navy work, had been using to keep afloat—has also dried up. That includes oil drilling rigs, conventional repair work, and the building of tugs and barges.

The shipyard blues are not confined to the U.S. They are a worldwide occurrence. The Japanese, long the kings of the industry, are getting out of the business—under-priced by other Asian nations.

And last fall a group of West European shipbuilders was predicting that world shipbuilding recovery would not begin until 1987. Their report read, "It's predicted that yearly deliveries will remain close to the level of 1981/1982 until 1987 when a recovery is forecast to begin. Assuming that a ship has to be ordered one to two years before completion, the volume of new orders should begin to recover in 1985-1986."

Rail Cars

It would take more than a mild recovery in 1983 to help freight rail car builders. It would take a roaring boom of the proportions of those in the 1960s.

The reasons are these: The railroads have more cars now than they need. Many relatively new cars are in storage. Because of the recession, the railroads are doing less hauling and using fewer cars.

The products they haul the most—steel, autos, coal, construction materials—are all extremely depressed. And until they come back strong, the carriers won't even begin thinking about needing new cars.

Says a manufacturer of castings for rail cars, "Basically we would have to have one whale of an economic boost—larger than ever seen—to lift this industry out of the doldrums."

The rail car industry is also suffering a hangover from the over building that took place in the late 1970s. In 1979, for example, there were 119,000 new cars ordered and 90,000 delivered, according to the American Railway Car Institute. That's why there are currently so many rail cars now in storage.

Contrast those figures with the level of orders in 1981—25,000—and those estimated for 1982 and 1983 (see chart). The 7,500 unit total for 1982 may have been a little optimistic. Through the first ten months of last year only 7,191 cars had been ordered. In October, 1982 only 884 cars were ordered.

Similarly, the estimate of new orders in 1983 used here—18,000—may be a bit optimistic and assumes a firm economic recovery. Estimates by those in the industry and by outside economic forecasters range from 13,000 up to about 20,000.

Deliveries are also in an anemic condition. Through the first ten months they amounted to 17,070. And a supplier of equipment for the car bodies says about 60,000 deliveries used to be considered just a normal year!

He goes on to say that deliveries in 1982 were probably at their lowest level since 1937 and 1938 when the total was in the 16,000 unit range. With fingers crossed, he estimates that deliveries this year could reach about 28,000.

This is a noble goal because some rail car makers have closed down their entire operation until this coming spring. And the foundries which supply the axles, wheels and other rail car components are also cutting back or shutting down entirely.

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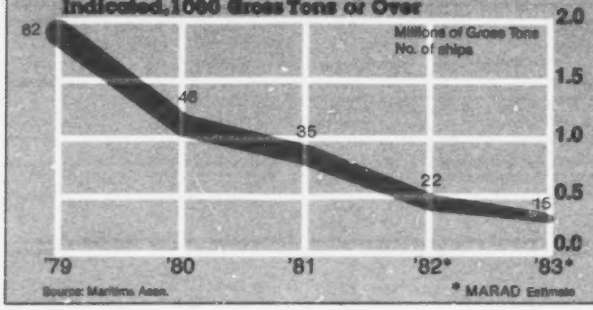
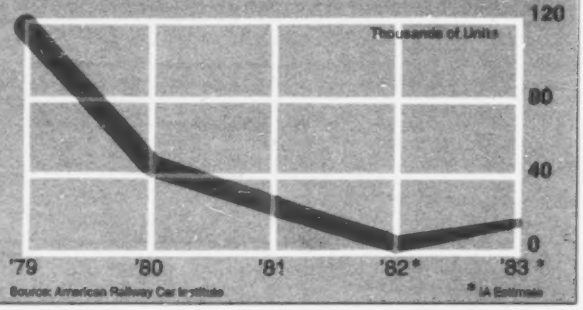
Shipbuilding, Commercial Ships on Order or Under Construction, on Dec. 31st of Each Year Indicated, 1000 Gross Tons or Over



Source: Maritime Assn. * MARAD Estimate

Rail Car Orders



Source: American Railway Car Institute * IA Estimate

LOW COSTS AND HIGH QUALITY:

THE ONE-TWO PUNCH OF THE ELECTRIC FURNACE

Electric furnace mills have had a cost advantage in most recent years but it has now reached gigantic proportions.

By George J. McManus

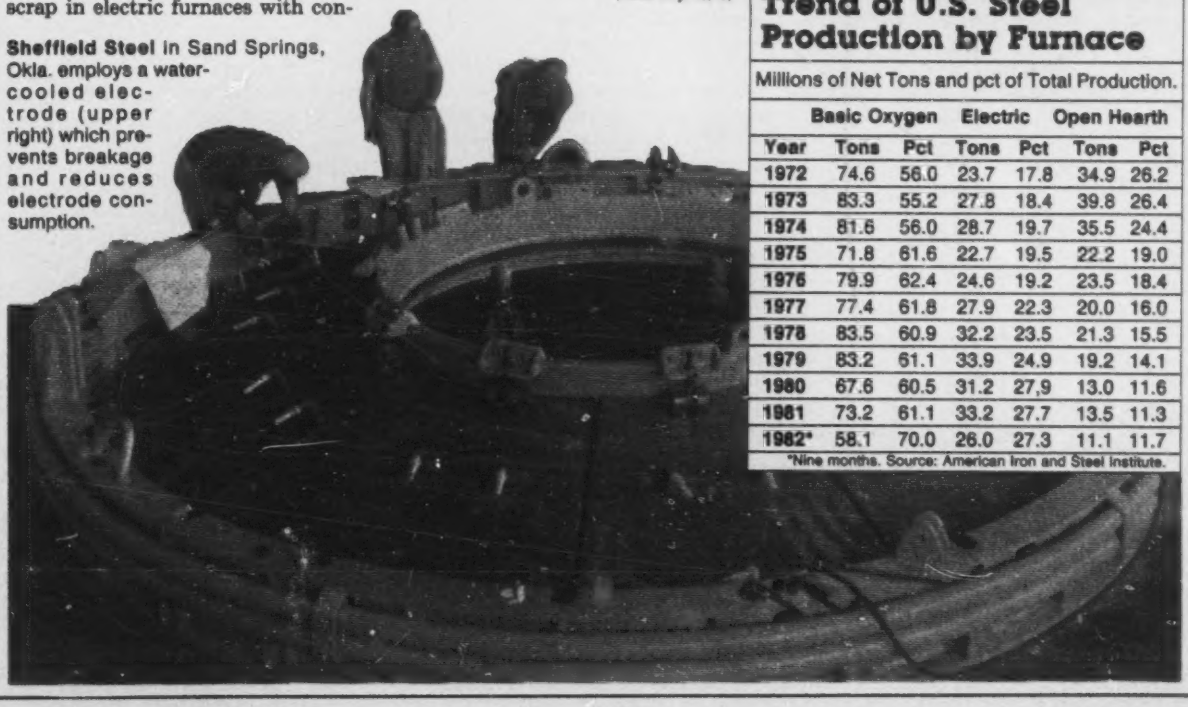
"Devastating." That was the reaction of one chief executive to word that Inland Steel Co. had reduced bar prices as much as $100 a ton.

Inland didn't exactly reduce price. The company established a product class known as Cold Melt Steel (CMS) bars. These are made from scrap in electric furnaces with continuous casting.

Inland has priced the scrap-based bars well below bars made from blast furnace hot metal in oxygen furnaces or openhearths. The price action is partly a reflection of growing competition from minimills.

The action also reflects something that could, indeed, have devastating effects. The steel industry now has a two-tier cost structure. If you start with ore and coal mines and follow through coke ovens, blast furnaces,

(Cont. on p. MP-8)



Sheffield Steel in Sand Springs, Okla. employs a water-cooled electrode (upper right) which prevents breakage and reduces electrode consumption.

Trend of U.S. Steel Production by Furnace

Millions of Net Tons and pct of Total Production.

	Basic Oxygen		Electric		Open Hearth	
Year	Tons	Pct	Tons	Pct	Tons	Pct
1972	74.6	56.0	23.7	17.8	34.9	26.2
1973	83.3	55.2	27.8	18.4	39.8	26.4
1974	81.6	56.0	28.7	19.7	35.5	24.4
1975	71.8	61.6	22.7	19.5	22.2	19.0
1976	79.9	62.4	24.6	19.2	23.5	18.4
1977	77.4	61.8	27.9	22.3	20.0	16.0
1978	83.5	60.9	32.2	23.5	21.3	15.5
1979	83.2	61.1	33.9	24.9	19.2	14.1
1980	67.6	60.5	31.2	27.9	13.0	11.6
1981	73.2	61.1	33.2	27.7	13.5	11.3
1982*	58.1	70.0	26.0	27.3	11.1	11.7

*Nine months. Source: American Iron and Steel Institute.

(Cont. from p. MP-7)

steel furnaces and ingots, your costs are high and inflexible.

Much lower and more flexible are the costs of mills that melt scrap in electric furnaces and form the liquid metal in continuous casters. The electric furnace people have had a cost edge in most recent years, but it has now reached gigantic proportions. Steel scrap is selling for $50 to $60 a ton today. It's estimated that blast furnace hot metal has a cost of $170 a ton.

Until fairly recently, the two cost tiers were segregated. The minimills moved into the merchant bar market. The integrated mills backed away from merchant products and concentrated on industrial products and markets.

Now, the picture is changing. The electric furnace mills are turning to the high quality, industrial products. This is happening at a time when competition is bringing prices down to the levels of cost and below.

Just how far the minimills have progressed in the industrial bar market depends on whom you talk to. Participation by the smaller mills is confined to the lower fringe of the market, says one tonnage producer. Individual minimills offer a different view.

Chaparral Steel Co., for one, makes special bar quality. "We have for the last four or five years," says J. A. Werner, vice president, marketing and planning. "It's very important to us."

The Monroe, Mich., plant of North Star Steel Corp. puts about 30 pct of its bars into industrial applications. Kentucky Electric Steel Co. gets 70 pct of its business from quality bar products.

"We're gaining market share during this down market," says T. G. Newman, sales vice president for Kentucky Electric.

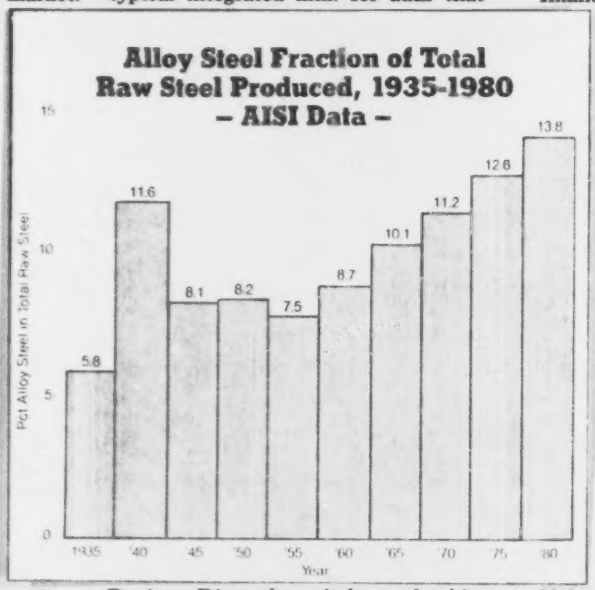
There are other areas where the two-tier cost structure could come into play. A significant portion of the country's steel plate is now made from electric furnace steel. For the most part, these furnaces are operated by the traditional plate producers.

In the Youngstown area, Hunt Steel is building the first minimill to make oil country seamless products. A new seamless mill is planned for the Southwest by York-Hanover Seamless Tube, Inc.

In the wire rod field, new companies are crowding the integrated producers. "There's no way these plants can compete with us," says W. J. Shields, president of Raritan River Steel Corp.

Mr. Shields notes that Jones & Laughlin Steel Corp. closed its rod mill at Aliquippa, Pa., in 1981. Apart from scrap costs, he says, a company like Raritan River has an advantage in operating efficiency. Raritan River has a high powered electric furnace, a five-strand billet caster, and a high speed Morgan rod mill.

With this lineup, says Mr. Shields, labor is only 15 pct of the company's cost. He compares that with 35 pct for a typical integrated mill. He adds that Raritan River doesn't have the $24 hourly employment cost of mills organized by United Steelworkers.



There are three distinct elements in the cost equation. One is the cost of scrap versus the cost of blast furnace hot metal. Scrap has been consistently less expensive in recent years and is a lot less expensive right now.

A second factor is the conversion cost in an electric furnace versus the cost in a basic oxygen furnace. Here, the picture is fluid. With water cooling, oxy-fuel burners and high power, the electric furnace keeps making efficiency gains. The performance of the oxygen furnace is also improving, and ways are being found to melt more scrap in the furnace.

The third element is continuous casting versus ingot practice. All the major minimills are 100 pct continuous casting. A number of the major mills have electric furnaces and a number have billet casters. In only a few cases are the electric furnaces tied in with the billet casters and with bar mills. Because of iron ore commitments, some of the integrated mills have shut down their electric furnaces.

CF&I Steel Corp. has gone the other way, shutting down blast furnaces and concentrating production in electric furnaces. The electrics are tied in with continuous casting.

Inland Steel has a minimill set-up: electric furnaces, billet casting, and bar mills. Inland also has a blast furnace-BOP complex and is continuing to operate this.

"We are fortunate in that we've got both facilities," says J. W. Cox, manager of sales for Inland's bar division.

Inland considers this fortunate because it still sees a place for what it calls Hot Melt Steel (HMS) bars. "HMS bars will meet the quality needs that only an integrated steel producer can provide," the company's announcement stated.

At the same time, Inland is quick to say there's nothing wrong with its Cold Melt Steel (CMS) bars. "This is not a second class product," says Mr. Cox. "The reason for the high price (on HMS) is more for the method of manufacture than from any quality distinction."

Why, then, would anyone pay more for the hot melt bars? Mr. Cox acknowledges this is a good question. "I guess that's why we made the move," he says. "We were losing business."

If these statements seem a little contradictory, they really aren't. The electric furnace-continuous casting route is fine where it can be used. "One charateristic of continuous cast steel is the better surface," says Mr. Fox of North Star.

However, the casting process still has some limitations. Lead-free machining steel is a problem product; the lead vaporizes off. There are some auto specifications that call for ingot practice. The area reduction specifications in some cases make it necessary to start with large ingots.

With regard to size, Inland's Cold Melt price doesn't apply to rounds over 3⅜ inch diameter. Chaparral's maximum round size is 4 inches. Kentucky Electric has a maximum billet size of 5 by 7 inches. That translates into a maximum round of 2½ inches.

Apart from size and chemistry, the habits and perceptions of a few customers still favor the old, tried and true ways. "This becomes a very subjective thing," says Mr. Werner of Chaparral.

There were some real problems when continuous casting was first applied to

quality bars. Contributing to the problems were overly ambitious actions of mills that had grown up rebars and other construction products.

"Some small mills tried to jump in and take business they weren't equipped to handle," says Mr. Newman of Kentucky Electric.

This did give continuous casting a bad name with bar users, he says, but the problems are now ancient history. Kentucky Electric makes carbon, special quality, low alloy and alloy bars. The company has six metallurgists and considers its lab one of the best in the industry.

"No one is looking down their nose at Japanese quality," says Mr. Fox of North Star. The Japanese are continuously casting a high percentage of their steel, he notes.

In the rod field, says Mr. Shields, Raritan River has been given a No. 1 rating by a number of wire drawing plants with critical quality requirements.

In terms of market acceptance and technology, Inland feels continuous casting of bar steel has reached full maturity. This conclusion influenced the timing of Inland's price move.

"We wanted to see the technical improvements in strand cast steel." says Mr. Cox.

The other factor in Inland's decision was competitive pressure. "We are a market driven company," says Mr. Cox. "The market determined where the price should be."

He estimates the minimills have taken over 30 pct of the total bar market. With demand down, this slice forced general recognition of minimill prices.

"Inland is just doing what all of us have been doing right along," said the head of one large bar mill.

The thrust of the minimills brings a different style of management to bear on the steel industry. Nucor Corp., for example, has a philosophy of cutting prices and trying to maintain production. The traditional steel view was that you cut production and tried to maintain prices.

As a practical matter, the old tradition was abandoned long ago. There has been widespread discounting by tonnage mills in recent years. However, minimill prices are probably more volatile than tonnage mill prices, moving up as well as down.

As this suggests, the minimills believe there is price-volume elasticity in their markets. This is partly a matter of taking business from other companies, but it also involves the markets, themselves.

After Inland's price announcement, Chaparral Steel put through its own price cuts. The timing of Chaparral's action was affected by Inland, but the price changes were planned earlier for the first of the year.

"We're seeing more downstream penetration by imports of fasteners, forgings and other products," says Mr. Werner of Chaparral. His thought is that the well-being of customers depends partly on getting bars at prices that are competitive with those of foreign steel mills.

Much the same point is made by Mr. Newman of Kentucky Electric. "We're beginning to see more and more imports of finished parts," he says. He mentions auto leaf springs as one imported item.

This electric arc furnace at Raritan River Steel has a 93 MVA transformer rating and is computerized to ensure consistency of the steel product produced.

"Our basic philosophy," says Mr. Newman, "is that within the next five years, you've got to be able to compete in the world market. We have to be able to compete so our customers can compete."

Wire rod producers are less enthusiastic about the one-world concept. Dumping complaints against rod from Brazil, Trinidad, and Tobago were filed Sept. 30 by Atlantic Steel Co., Raritan River and others. Complaints against European rod producers were only withdrawn after the recent voluntary quota agreement.

Nevertheless, Kentucky Electric is addressing itself more to foreign competition than to the domestic tonnage mills. "We basically don't see the major mills as long-term competitors," says Mr. Newman.

These comments are typical of the expansive, confident attitudes found among the minimill people. With the tonnage industry going through another painful contraction, the minimills are pushing for a larger place in the sun.

"We market in 36 states," says Mr. Shields of Raritan River. "We can produce 650,000 tons." These are hardly minimill dimensions, he notes.

"We just completed a $30 million expansion," says Mr. Newman. This has doubled Kentucky Electric's capacity.

Chaparral has spent $200 million to build a complete new mill. This has raised the company's melting capacity to 1 million tons and its rolling capacity to 1.6 million tons.

Quanex Corp. is building a 280,000-ton plant at Fort Smith, Ark. Ohio River Steel Corp. is bringing a new rolling mill on stream. Nucor, Bayou Steel Corp., and Florida Steel Corp. recently built new plants.

None of which means the minimills

are getting rich right now. Costs are down but so are prices and orders. Florida Steel Corp. lost $2.2 million in the third quarter. A third quarter loss of $3.2 million was reported by Roblin Industries, Inc., which owns Roblin Steel Co.

Chaparral was holding its own, partly on the basis of new accounts. "We don't see any dramatic pickup for the next six or seven months," said Mr. Newman of Kentucky Electric.

With regard to the longer term, a number of factors will influence the direction of minimills. One is capital cost. The low capital costs of minimills have been based partly on making products that require a limited amount of finishing. To get in on the sheet business with conventional mills today would probably take at least $1 billion. This picture may change but right now there is no such thing as a small sheet mill.

As a general rule, capital costs tend to rise as you go up the quality scale. For conditioning bars at Canton, Ohio, Republic Steel Corp. has installed what is probably the world's largest grinding complex.

At Warren, Ohio, Copperweld Steel recently completed a $64 million program that included new grinding, cold finishing and heat treating facilities. Another $12.5 million was then spent on six machine grinders.

The minimill competition has been "less in the value added products," says R. L. Loughhead, president of Copperweld Steel. By value added, Mr. Loughhead means heat treated or cold finished.

Capital costs are also being affected by the tighter standards for quality steels. The Japanese have made steels with sulfur contents as low as .001, says Ralph Smailer, industrial group manager for arc furnaces at Davy McKee Equipment Corp.

In the old days, electric furnace practice was ideally suited to the removal of sulfur and other impurities. Used almost exclusively for specialty steels, the furnace was operated with an oxidizing slag first and then a reducing slag. With the second slag, sulfur could be brought down to .005.

When the electric furnace moved into carbon steel, it was scaled up and souped up. The emphasis on production made it undesirable to use the second slag practice. With oxygen lancing, moreover, and with pollution systems drawing air into the furnace, it became impractical to get reducing conditions.

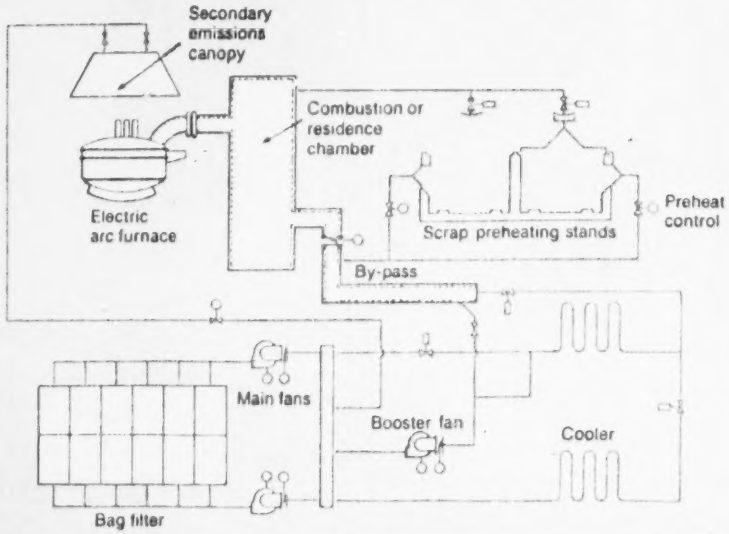
That is one of the many considerations that have led to the spread of ladle refining. Davy-McKee has signed up to provide the ladle technology of Japan's Daido Steel. One of the tricks, says Mr. Smailer, is to make a good, 'white' reducing slag in the ladle.

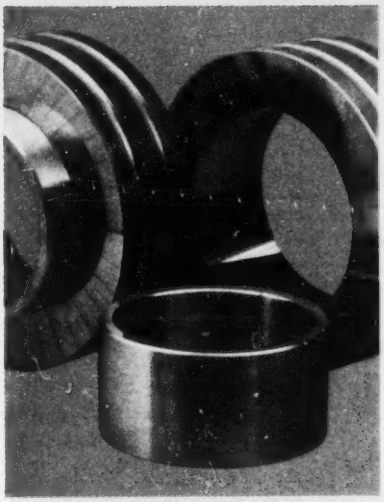
"As you lower the slag's oxidizing potential," he says, "it sucks up sulfur."

There is no question ladle treatment is closely linked to the future of electric steelmaking—all steelmaking, for that matter. "We've sold five ladle metallurgy jobs since the first of the year," said T. B. Slovik, manager of arc furance sales for Lectromelt Corp.

As of October, the Lectromelt sales included: a twin-snorkel vacuum degasser to go with the new rail mill at the South Works of United States Steel Corp.; a ladle furnace with a desulfur-

Design for Scrap Preheating System





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Electric Furnace Production/Consumption

		1961	1971	1977	1978	1979	1980	1981
Ferrous Scrap for Recycling Purchased domestically by:	Steel Mills	—	22.7	26.1	30.3	32.1	29.3	30.2
	Foundries	—	11.3	15.8	15.8	14.9	11.7	11.8
	Total	**25.3**	**34.0**	**41.9**	**46.1**	**47.0**	**41.0**	**42.0**
Home Scrap Produced in:[1]	Steel Mills	—	42.6	42.4	44.9	45.4	37.0	38.4
	Foundries	—	6.6	7.1	7.2	6.8	5.2	4.8
	Total	**38.5**	**49.2**	**49.5**	**52.1**	**52.2**	**42.2**	**43.3**
Purchased & Home Scrap consumed by:[1]	Steel Mills	51.8	64.6	69.3	76.3	77.2	66.6	68.3
	Foundries	12.6	17.9	22.9	22.9	21.7	17.1	16.8
	Total	**64.3**	**82.6**	**92.2**	**99.2**	**98.9**	**83.7**	**85.1**
Exported (Includes purchased & home)[5]	Carbon***	9.7	5.52	5.95	8.78	10.75	10.86	6.24
	Stainless	**	1.00	0.08	0.11	0.11	0.12*	0.06
	Alloy**	**	0.05	0.07	0.15	0.20	0.19	0.11
Prices (Composite, yearly average in dollars per gross ton)[2]	No. 1 Heavy Melting	36.28	34.09	63.15	76.23	97.91	91.35	91.53
	No. 2 Bundles	24.72	23.55	44.11	50.28	62.89	63.71	64.31
Iron Ore[1]	Mined domestically	79.9	90.5	62.4	91.4	96.0	78.0	83.2
	Imported	28.9	44.9	42.5	37.6	37.8	28.1	31.7
	Blast furnace iron consumed	65.8	81.2	82.0	88.4	87.5	69.1	75.0
Ferrous Production	Raw Steel Production[3]	98.0	120.4	125.3	137.0	136.3	111.8	119.9
	Steel Mill Shipments[3]	66.1	87.0	91.1	97.9	100.3	83.9	87.0
	Ferrous Foundries—Castings Shipments[4]	12.8	16.3	17.5	18.1	17.2	13.8	12.0
Finished Steel Composite Price[2] (yearly average, cents-per-pound)		6.196	8.429	15.577	17.957	20.006	21.655	24.224
Steel Production[3] by type of furnace and percent of total output	Basic Oxygen Furnace	4.0	63.9	77.4	83.5	83.2	67.6	73.2
	Percent	**4.1%**	**53.1%**	**61.8%**	**60.9%**	**61.1%**	**60.5%**	**61.1%**
	Electric	8.7	20.9	27.9	32.2	33.9	31.2	33.2
	Percent	**8.8%**	**17.3%**	**22.3%**	**23.5%**	**24.9%**	**27.9%**	**27.7%**
	Open Hearth	84.5	35.6	20.0	21.3	19.2	13.0	13.5
	Percent	**86.2%**	**29.6%**	**16.0%**	**15.5%**	**14.1%**	**11.6%**	**11.3%**
Ferrous Scrap Consumption by Furnace (purchased & home)[1]	Basic Oxygen	1.4	20.1	25.0	26.0	26.5	21.9	23.3
	Blast	3.6	3.7	3.8	4.2	4.1	3.7	4.0
	Cupola	9.5	14.8	14.3	14.1	12.8	9.4	9.1
	Electric	10.1	24.7	36.4	41.3	43.6	40.2	39.6
	Open Hearth	37.9	18.8	11.1	11.8	10.5	7.4	7.5
	Other	1.9	0.8	1.6	1.9	1.5	1.2	1.5

Sources: [1]U.S. Bureau of Mines (in millions of net tons) [2]*Iron Age* [3]American Iron & Steel Institute (in millions of net tons) [4]U.S. Bureau of Census (in millions of net tons) [5]Pre-1975 U.S. Bureau of Mines; post-1975 U.S. Bureau of Census *Preliminary **Not reported separately; included in carbon ***Pre-1978 data adjusted for comparability with post-1977 data

ization lance for CF&I Steel Corp.; a desulfurization unit for Sharon Steel Corp.; and a ladle refining system for Marathon Le Tourneau Co. The Marathon system can perform seven different functions at one station.

A recent Lectromelt order for a multiple injection sulfur removal system came from Inland Steel. This will be used in the electric furnace shop.

Lectromelt has been supplying ladle systems since 1958. The company's process lineup gives some idea of the current scope and sophistication of secondary steelmaking. Processes offered under license from Vacmetal of West Germany include: D-H single snorkel, twin snorkel and continuous flow degassers; ladle degassers with oxygen refining and arc reheating; and stream degassing into both ladles and molds.

Lectromelt offers the ladle injection technology of Kloeckner Stahltecknik. The company is licensed to supply the tap hole slag stopper of Fabrique De Fer of Belgium.

The smaller electric furnace companies are among those moving with the trend toward secondary refining. At Jackson, Mich., the MacSteel Division of Quanex Corp. is equipped with a Lectromelt vacuum degasser and a Scandinavian lance injection system. In addition, the plant uses argon stirring on all heats. The new Quanex plant in Fort Smith, Ark., is being equipped with a secondary refining furnace.

These advances add to the operating efficiency and versatility of electric steelmaking. They also add to capital cost. The Japanese are said to be building ladle furnaces with as much power as a typical arc furnace a few years ago.

The arc furnace, itself, is undergoing major changes. Water cooled roofs and side walls, water cooled electrodes, oxy-fuel burners, and computers are making the furnace more efficient and more expensive.

It's possible added capital costs will change the nature of minimill steelmaking. Much more critical, however, are questions involving the quality, availability and price of steel scrap.

In recent years, indicates Mr. Fox of North Star, the real problem has been the inability of the domestic industry to absorb the available scrap. The overflow has been going to Japan and Europe and coming back as finished steel products, he says.

The export question is controversial, but recent domestic demand for scrap has not been excessive. Scrap purchases of domestic mills and foundries ranged between 41 and 47 million tons over the last five years. (The foundry portion is about a third.) The upper level was well

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(Cont. from p. MP-15)

below the 1974 peak of 51 million tons.

Slightly over half the purchased material is obsolete scrap. This is entirely suitable for many construction applications. "An angle is an angle is an angle," says Mr. Iverson of Nucor. As long as a merchant bar does the job, he indicates, users aren't interested in the metallurgical pedigree.

The so-called "tramp" elements, which are associated with obsolete scrap, aren't necessarily bad, says Mr. Fox of North Star. "I don't think we properly evaluate residuals," he says. "Twenty points of copper doubles the corrosion resistance of construction steel." It's possible to engineer around things like chrome, he says.

For many products and processes, however, it is necessary to use a good grade of scrap. "You get nervous when copper is around 0.18 or 0.20," says E. L. Bartolotta, manager of technical services at the Lorain Works of U. S. Steel. "Especially when the sulfur is high."

The high alloy content can cause cracking when the steel is hot worked. It produces oscillation cracks in continuous casting. For sheet grades, the chemistry of the steel is critical.

"Residuals do cause a loss of ductility," says Mr. Bartolotta. U. S. Steel feels the total alloy content for tinplate and deep drawing sheet should not exceed 0.12 pct.

Minimill people say there is no problem getting good quality material. "If you want to segregate scrap," says Mr. Iverson, "you can come up with the same residuals (as hot metal). We do segregate our scrap for cold finished bars."

Prompt industrial scrap "is becoming more and more available," says Mr. Shields of Raritan River. He notes that Raritan River recently bought scrap from a Ford Motor plant that has traditionally sold to one of the integrated mills. He adds that Raritan River is producing rods "of a quality I wouldn't have believed a few years ago."

Others are equally confident. "There is going to be a continuing good supply of good scrap," says D. R. Gill, director of purchases and traffic for Lukens. Residual content "is a problem but one we've learned to live with."

Nevertheless, there is a finite limit to the supply of prompt industrial scrap. More specifically, there is a limit to the amount of industrial scrap available at low prices.

"I do not see any shortage as long as electric furnace steel does not go over 33 pct and total steel production above 130 million tons for a sustained period," says W. W. Blauvelt, president, Luria Brothers & Co., Inc.

If you get that combination, says Mr. Blauvelt, "then you begin to come to the limits of industrial scrap." In 1979, he notes, the price of industrial scrap rose to $140 a ton when raw steel output went over 136 million tons.

Most estimates call for sluggish growth of the steel market in coming years, says Mr. Blauvelt. If the forecasts are right, he indicates, there should be enough scrap.

In the past, rising scrap prices have been accomplished by rising steel prices. During the 1974 boom, the minimills were able to add scrap surcharges to their prices. More important, when steel prices have weakened, the same thing has happened to scrap prices.

So far, the price pattern hasn't been altered by the added scrap melting potential of new electric furnaces. The electric furnace portion of steelmaking increased from 17.8 pct in 1972 to 27.9 pct in 1980. There has been no increase in the percentage since 1980 although big electric furnaces have come on stream at Jones & Laughlin Steel Corp. in Pittsburgh, Bethlehem Steel Corp. at Johnstown, Pa., and at Crucible Steel in Midland, Pa. These are in addition to the minimill expansions.

The recession has prevented the test of scrap supply that might have been provided by new furnace capacity. Crucible's Midland plant has been closed. Bethlehem isn't operating its Johnstown furnaces. Jones & Laughlin has turned off the new electric furnaces at Pittsburgh as well as older furnaces at Cleveland.

Part of the problem is the cash squeeze. Scrap is cheap but its use entails cash outlays. The mills must pay for iron ore, too, but in many cases, they are committed to a certain quality of ore. As a result, companies are forced to increase their hot metal percentage at a time when scrap is much less expensive.

Because of this experience and other developments, integrated producers are considering strategy that would give greater flexibility of raw materials. Apart from the scrap situation, there is a desire to make use of the rich ores available at low prices on the open market.

"With the development of new iron ore deposits in Brazil, additional pressures downward will be put on ore prices," says W. R. Roesch, president of United States Steel Corp.

The integrated mills are also working on ways to melt more scrap in basic oxygen furnaces. Combined blowing and carbon injections are being tried. Kaiser Steel Corp., which has announced the shutdown of blast furnaces and coke ovens, is keeping close tabs on German

(Cont. on p. MP-20)

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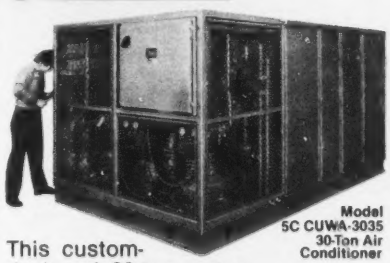

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(Cont. from p. MP-17)

developments involving an all-scrap charge.

U. S. Steel has been able to boost scrap charges by using soaking pits for pre-heating. Others have pre-heated by injecting oil through the bottom tuyeres of oxygen furnaces.

There is no question the basic oxygen furnace, with its limited scrap melting capability, has been a major factor in keeping scrap prices low and scrap supplies ample. According to one authority, the price and supply balance would be altered significantly by just a 1 or 2 pct increase in the scrap purchases of integrated mills.

Another factor could be a general build-up of residuals in scrap. The residuals include copper, nickel, chromium, molybdenum and a few other non-oxidizable elements.

"No economical refining method exists for removal of these impurities once they enter liquid solution with iron," says R. D. Burlingame, director of research for Luria Bros.

Making for a residual buildup, says Dr. Burlingame, is a steady increase in the alloy portion of steel output. He notes that various studies call for this trend to continue.

Without highly sophisticated systems, he says, it's probable that "look-alike carbon and alloy steels will unavoidably become increasingly co-mingled upon recycling both as prompt industrial scrap and as obsolete scrap."

Apart from internal alloys, says Dr. Burlingame, scrap can pick all kinds of nonferrous metal as it passes through the manufacturing and recycling sequences.

"The practical question," he concludes, "is when will the tramp alloy quality of the nation's scrap become a really serious problem."

Others are more optimistic, saying there is no hard evidence scrap quality is deteriorating. The American Iron and Steel Institute made one check. "They really could not pin down a buildup of residuals," says Mr. Gill of Lukens.

The American Foundrymen's Society received the results of another study early in 1982. "If anything was demonstrated, it was that there was insufficient evidence to make a case one way or another," says an official of the Society.

The Foundrymen group is now tracking scrap quality on a quarterly basis. "The committee has concluded more data will be needed to make a statistically reliable conclusion," says the same official.

The subject of scrap quality was touched on in a recent report on direct reduction by William T. Hogan, S. J. and F. T. Koelble of Fordham University.

"The general perception of the operators contacted is that the overall quality of their scrap has been deteriorating . . . ," said the report.

To meet quantity and quality needs, the report concluded, electric furnace shops could be charging as much as 5 million tons of direct reduced iron (DRI) by 1985.

This prospect presents no great technical challenge. "One year, 20 pct of our material was DRI from Georgetown," says Mr. Iverson of Nucor.

Electric furnace keeps advancing even though the industry is in the throes of a depression.

A move to large quantities of reduced iron would change the economics of electric steelmaking.

According to one recent estimate, cost of metallized iron ranges from $140 to $150 a ton. With scrap prices low and natural gas prices rising, Georgetown Steel has shut down its direct reduction plant.

Electric furnance technology keeps advancing. The building of complete new furnaces has been slowed by the recession but it has not been completely stopped.

New Krupp furnaces are going in at Babcock & Wilcox and Timken Co. A Krupp furnace is now operating at Bayou Steel Corp. Low power consumption and low electrode usage are advantages of this technology, says a Krupp official.

Domestic furnace builders say the big advantage of foreign competitors is that their association with foreign steel mills provides an opportunity to demonstrate new technology and also to provide a package that includes hands-on process training. Mannesmann Demag Corp., which has developed a bottom pour electric furnace, stresses its ability to provide process know-how for both continuous casters and furnaces.

The conversion of electric furnaces to water cooling has been checked by the slump. "I would probably say 30 to 40 pct are using some type of side wall coverage," says Al Kocher, manager of electric furnace product sales for Wean United, Inc.

Many of the remaining shops have indicated plans for water cooling when money is available. A recent development is the use of cast panels down to three or four inches above the slag line.

Mr. Kocher estimates 18 to 20 pct of the electric furnaces have water cooled roofs. Apart from the recession, he says, the switch to new roofs has been slowed by the longer lives of conventional roof refractories. Water cooled side walls have reduced erosion that the point where the roof sits on the sidewall.

There seems little question water cooling is the wave of the future. In addition to Wean United, suppliers include Korf & Fuchs Systems, Inc., Lectromelt, Mannesmann Demag and Danieli of America, Inc. Both Danieli and Mannesmann Demag use tubular systems.

Wean United is supplying the composite electrode developed by Stelco, Inc. In this design, a water-cooled steel jacket serves as the upper section. This gets away from the oxidizing of graphite by furnace gases. Reduced breakage and reduced electrode consumption are benefits.

Stelco composite electrodes are being used by Standard Steel in Burnham, Pa. Sheffield Steel is working with composite electrodes from Lectromelt.

The use of exhaust gases for pre-heating scrap is attracting interest. Baumco Inc. and Nippon Kokan are among the companies which have developed pre-heating systems. Both report success in preventing fumes from oily scrap.

"No pollution has been caused and environment inside the shop has scarcely been worsened," says Nippon Kokan.

Swank Metacon Systems Co. reports good results from the use of a slide gate to keep slag out of the ladle. A Swank Metacon taphole valve system has been installed at the Baytown, Tex., works of U. S. Steel.

Lectromelt says its Belgium system, which employs an articulating arm, gives less than 1 pct slag carryover.

The plasma furnace may finally be reaching commercial maturity. "We are installing a 50-ton facility in Linz," says an official of Voest-Alpine International Corp.

If historic ties mean anything, the location of the new furnace could be significant; it was at Linz, Austria, that the basic oxygen process was developed.

Advantages claimed for plasma include low noise levels and high alloy recovery. Voest has been working with the East Germans, who have been operating a 45-metric-ton furnace. Some of the technology may have emanated from Russia, where there is said to be a 200-ton plasma furnace. □

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Steel Production

World Steel Production

Raw steel, thousands of metric tons

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
Argentina	2,151	2,205	2,353	2,208	2,410	2,684	2,786	3,199	2,687	2,541	3,000
Australia	6,751	7,899	7,813	7,889	7,794	7,338	7,596	8,119	7,589	7,635	6,300
Austria	4,069	4,238	4,699	4,069	4,476	4,093	4,335	4,917	4,623	4,656	4,300
Belgium	14,532	15,522	16,227	11,582	12,145	11,256	12,601	13,442	12,322	12,283	9,800
Brazil	6,516	7,150	7,515	8,387	9,253	11,253	12,205	13,893	15,309	13,213	13,300
Bulgaria	2,121	2,246	2,188	2,295	2,460	2,589	2,489	2,482	2,567	2,483	2,500
Canada	11,863	13,388	13,623	13,025	13,290	13,631	14,899	16,054	15,901	14,811	12,150
China*	23,383	25,219	21,119	23,903	20,459	23,740	31,780	34,484	37,121	35,900	35,500
Czechoslovakia	12,728	13,158	13,640	14,324	14,693	15,054	15,294	14,817	14,925	15,270	15,000
France	24,054	25,270	27,021	21,531	23,227	22,094	22,844	23,360	23,176	21,261	18,500
W. Germany	43,705	49,521	53,232	40,412	42,413	38,984	41,253	46,040	43,838	41,610	35,750
E. Germany	6,065	5,855	6,185	6,480	6,740	6,850	6,978	7,024	7,308	7,467	7,500
Hungary	3,273	3,332	3,468	3,671	3,652	3,723	3,773	3,907	3,767	3,645	3,700
India	6,856	6,869	7,068	7,991	9,384	10,009	10,099	10,126	9,514	10,780	10,300
Italy	19,613	20,995	23,804	21,865	23,455	23,335	24,283	24,250	26,501	24,777	24,000
Japan	96,900	119,322	117,131	102,313	107,399	102,405	102,105	111,748	111,395	101,676	99,800
N. Korea*	2,500	2,900	3,200	2,900	3,000	4,000	5,000	5,400	5,800	5,500	5,750
S. Korea	586	1,157	1,947	1,994	3,515	4,347	4,969	7,610	8,558	10,753	11,800
Luxembourg	5,457	5,924	6,447	4,824	4,565	4,329	4,790	4,949	4,618	3,791	3,400
Mexico	4,431	4,780	5,136	5,272	5,298	5,801	6,711	7,005	7,089	7,605	7,100
Netherlands	5,585	5,823	5,837	4,817	5,178	4,923	5,583	5,806	5,264	5,484	4,450
Poland	13,424	14,057	14,556	15,007	15,640	17,841	19,251	19,218	19,485	15,719	15,700
Rumania	7,401	8,161	8,840	9,549	10,970	11,457	11,780	12,909	13,175	13,025	14,000
South Africa	5,337	5,722	5,839	6,831	7,106	7,295	7,902	8,876	9,068	9,004	8,500
Spain	9,526	10,800	11,502	11,102	10,982	11,169	11,339	12,248	12,672	12,919	13,200
Sweden	5,257	5,663	5,988	5,611	5,139	3,958	4,327	4,700	4,237	3,770	3,950
U.K.	25,431	26,687	22,384	19,773	22,396	20,467	20,367	21,523	11,342	15,573	14,000
U.S.S.R.	125,589	131,481	136,200	141,325	144,805	146,655	151,400	149,087	147,931	148,517	146,000
U.S.	120,874	136,902	132,195	105,816	116,120	114,700	124,002	123,276	101,896	108,782	67,500
Yugoslavia	2,588	2,676	2,636	2,916	2,751	3,182	3,456	3,535	3,634	3,977	3,800
Others	11,076	13,022	13,790	13,548	14,970	17,672	21,061	24,612	25,748	22,749	22,450
Total	638,735	687,534	703,763	642,880	675,511	675,635	717,150	746,448	718,818	706,856	645,800

*Estimates. Source International Iron and Steel Institute.

U.S. Yearly Raw Steel Production†

Net Tons

	Openhearth		Basic Oxygen Process		Bessemer**		Electric**		
	Production	Percent of Total Output	Production	Percent of Total Output	Product	Percent of Total Output	Production	Percent of Total Output	Total Production
1952	82,846,439	88.9	---	---	3,523,677	3.8	6,797,923	7.3	93,168,039
1953	100,473,823	90.0	---	---	3,855,705	3.5	7,280,191	6.5	111,609,719
1954	80,327,494	91.0	---	---	2,584,104	2.9	5,436,054	6.1	88,311,652
1955	105,359,417	90.0	307,279	---	3,319,517	2.8	8,049,872	7.2	117,036,085
1956	102,840,585	89.2	506,338	---	3,227,907	2.8	8,641,229	8.0	115,216,149
1957	101,657,776	90.2	611,508	---	2,475,136	2.2	7,970,574	7.6	112,714,996
1958	75,879,394	89.0	1,323,361	1.5	1,395,985	1.6	6,656,145	7.9	85,254,885
1959	81,868,987	87.3	1,864,338	2.0	1,380,283	1.5	8,532,514	9.2	93,446,132
1960	96,367,506	87.0	3,346,150	3.3	1,189,196	1.5	8,378,743	9.2	99,281,601
1961	84,502,071	86.2	3,967,158	4.0	881,080	.89	8,664,203	8.9	98,014,492
1962	82,957,318	84.8	5,552,697	5.2	804,964	.8	9,012,806	9.2	98,327,785
1963	88,833,985	81.3	8,544,078	7.8	982,659	.9	10,920,287	10.0	109,260,949
1964	98,097,499	77.2	15,442,186	12.2	857,586	0.6	12,678,496	10.0	127,075,767
1965	94,193,225	71.7	22,878,805	17.4	585,965	0.4	13,803,806	10.5	131,461,801
1966	85,024,572	63.4	33,928,374	25.4	278,119	0.2	14,870,363	11.0	134,101,428
1967	70,890,028	55.6	41,434,350	32.5	**	**	15,088,545	11.9	127,212,923
1968	65,836,000	50.1	48,812,000	37.2	**	**	16,814,000	12.7	131,462,000
1969	60,894,041	43.1	60,235,671	42.7	**	**	20,131,950	14.2	141,261,662
1970	48,022,000	36.6	63,330,000	48.2	**	**	20,162,000	15.2	131,514,000
1971	35,559,000	29.5	63,943,000	53.1	**	**	20,941,000	17.4	120,443,000
1972	34,936,000	26.2	74,584,000	56.0	**	**	23,721,000	17.8	133,241,000
1973	39,780,000	26.4	83,260,000	55.2	**	**	27,759,000	18.4	150,799,000
1974	35,499,000	24.3	81,552,000	56.0	**	**	28,889,000	19.7	145,720,000
1975	22,161,000	19.1	71,801,000	61.5	**	**	22,680,000	19.4	116,642,000
1976	23,470,000	18.3	79,916,000	62.4	**	**	24,612,000	19.3	128,000,000
1977	20,043,000	16.0	77,408,000	61.8	---	---	27,882,000	22.2	125,333,000
1978	21,310,000	15.5	83,464,000	61.0	---	---	32,287,000	23.5	137,031,000
1979	19,158,000	14.0	83,256,000	61.0	---	---	33,927,000	23.0	136,341,000
1980	13,054,000	11.7	67,615,000	60.4	---	---	31,166,000	27.9	111,835,000
1981	13,452,000	11.1	73,231,000	60.6	---	---	34,145,000	20.3	120,828,000
1982††	---	---	---	---	---	---	---	---	73,000,000

*Includes very small tonnages of crucible steel. †† IRON AGE estimate. Source: American Iron & Steel Institute.
**Included in openhearth since 1966. † Steel in first solid state after melting suitable for further processing or sale, including ingots, steel castings and strand or pressure cast blooms, billets, slabs, or other product forms.

U.S. Raw Steel Production, Rate of Capability Utilization

	1964†	1965	1966††	1967		1968	1969	1970	1971	1972	1973	1974		1975†††	1976	1977	1978	1979	1980	1981	1982
Jan.	115.5	143.4	97.9	98.4	Jan.	111.2	102.6	104.1	104.3	92.6	114.5	117.8	Jan.	90.4	74.4	66.8	77.2	83.5	82.7	79.9	59.3
Feb.	122.9	145.8	105.0	102.9	Feb.	116.7	111.8	107.6	111.4	98.7	119.1	118.8	Feb.	93.8	80.1	72.1	80.1	87.9	85.3	83.7	60.9
Mar.	127.2	149.7	111.8	101.5	Mar.	117.7	114.8	110.0	117.0	107.3	121.1	118.1	Mar.	93.4	85.4	81.2	83.1	94.5	88.4	88.6	61.7
Apr.	132.3	149.9	110.6	99.0	Apr.	119.1	116.1	108.9	120.2	110.8	122.3	119.0	Apr.	84.9	88.4	83.3	88.5	93.4	83.0	87.7	55.2
May	134.1	145.6	112.8	97.9	May	117.5	114.4	107.1	119.6	110.5	121.9	118.0	May	75.9	90.8	88.1	91.5	94.8	89.6	86.2	50.9
June	127.6	145.2	109.1	91.6	June	113.9	113.0	108.3	109.9	105.0	119.4	116.5	June	69.6	89.7	84.9	91.1	93.7	58.4	81.5	47.7
July	122.5	140.0	99.9	89.0	July	106.0	105.2	99.8	92.0	95.7	113.8	112.5	July	65.1	84.8	76.7	85.1	89.9	53.1	77.6	43.8
Aug.	127.5	137.3	102.7	95.3	Aug.	82.9	105.7	99.6	53.4	100.4	112.7	109.6	Aug.	67.3	82.8	77.2	86.3	86.0	54.8	77.3	42.4
Sept.	133.6	124.6	107.9	99.8	Sept.	77.3	110.2	102.6	73.4	104.4	117.0	113.3	Sept.	74.7	80.4	77.2	86.6	82.8	62.7	75.9	41.9
Oct.	140.2	112.7	106.5	103.4	Oct.	83.4	114.1	99.0	76.0	107.9	119.2	116.8	Oct.	69.0	75.6	77.7	86.1	84.4	72.2	68.7	40.2
Nov.	141.4	110.5	104.1	108.1	Nov.	91.7	114.0	95.7	77.0	109.0	120.4	111.1	Nov.	67.4	72.2	75.0	89.4	80.6	79.5	62.8	34.6*
Dec.	140.7	116.7	96.6	110.6	Dec.	96.5	109.3	96.6	81.3	109.9	117.7	101.4	Dec.	66.2	67.8	74.7	87.7	78.0	77.8	58.6	32.00*
Average	130.5	135.3	105.6	100.0	Average	103.1	111.0	103.4	94.7	104.5	118.5	114.5	Average	76.2	80.9	78.4	86.8	87.8	72.8	78.3	47.6*

*Estimate. †AISI Index of Production (1957-1950=100). ††Production index 1967=100, revised back to 1966 in Jan. 1971.
†††Rate of Capability Utilization, begun January, 1976, revised back to January, 1975.

Source: AISI

U.S. Monthly Raw Steel† Production, Millions of Tons

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Jan.	11,008,762	6,753,912	9,317,385	12,049,404	6,416,004	10,352,748	8,390,914	9,526,000	11,830,469	10,577,000	10,633,000	12,014,599	11,083,447
Feb.	9,987,206	5,782,323	9,602,938	11,126,806	6,739,098	9,698,316	8,222,352	9,485,359	10,865,869	10,249,000	10,041,000	11,794,896	10,915,021
Mar.	10,599,074	6,254,622	11,567,745	11,564,883	7,086,389	10,583,943	10,080,014	10,496,987	12,346,963	12,083,000	10,963,000	12,721,053	12,400,375
Apr.	9,814,780	5,532,991	11,281,920	9,777,857	7,584,687	9,235,881	10,695,362	10,560,651	11,966,162	11,570,000	10,349,000	12,450,040	12,142,751
May	9,782,323	6,201,159	11,600,581	8,830,472	8,980,626	7,535,506	11,489,524	11,060,357	12,012,449	12,191,000	10,577,000	12,700,325	12,356,384
June	9,391,402	7,127,480	10,907,634	7,404,873	8,551,856	6,891,785	10,365,154	10,184,634	11,593,450	11,403,000	9,576,000	11,905,936	11,810,287
July	8,908,732	6,420,405	5,227,129	6,350,924	8,091,956	6,174,187	8,653,544	10,105,609	11,550,988	10,791,000	9,620,000	11,452,388	11,365,146
Aug.	9,233,732	7,286,003	1,439,277	6,838,000	8,660,527	7,097,916	7,781,560	10,515,268	11,324,149	11,097,000	10,300,000	8,955,712	11,420,995
Sept.	8,977,906	7,810,372	1,535,017	6,458,421	8,904,000	7,251,023	7,858,009	10,668,978	9,949,355	11,280,000	10,438,000	8,085,770	11,523,106
Oct.	9,197,717	8,839,778	1,704,533	6,868,380	9,173,170	7,780,538	8,483,160	11,568,246	9,295,828	11,509,000	11,171,000	9,006,237	12,323,544
Nov.	8,392,919	8,599,318	7,267,607	6,171,940	8,745,966	7,846,057	8,488,239	11,292,070	8,822,186	10,887,000	11,299,000	9,590,000	11,916,305
Dec.	7,420,285	8,710,522	11,989,319	5,839,841	9,568,954	8,079,885	8,753,117	11,611,606	9,627,156	10,435,000	11,953,000	10,421,000	11,812,097
Total	112,714,996	85,254,895	93,448,132	99,281,601	98,814,492	98,327,785	109,208,949	127,875,767	131,481,601	134,101,000	127,213,000	131,662,000	141,261,662

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Jan.	11,242,855	11,273,740	10,001,028	12,372,882	12,726,000	11,584,190	9,834,725	9,089,254	10,301,277	11,104,826	10,700,736	10,590,135	7,737,389
Feb.	10,498,356	10,874,377	9,979,752	11,625,734	11,598,000	10,861,663	9,906,523	8,858,898	9,643,242	10,562,363	10,331,868	10,028,344	7,177,979
Mar.	11,885,561	12,645,241	11,587,946	13,088,378	12,756,000	11,980,244	11,294,279	11,049,228	11,082,583	12,575,987	11,438,944	11,744,370	8,048,621
Apr.	11,385,675	12,564,686	11,587,706	12,788,629	12,442,000	10,667,492	11,439,185	11,166,557	11,526,367	12,195,612	10,658,202	11,242,726	7,005,717
May	11,574,485	12,920,415	11,936,558	13,174,088	12,752,000	9,863,557	12,136,009	12,200,852	12,320,398	12,788,673	9,225,991	11,422,988	6,678,457
June	11,323,086	11,490,602	10,979,970	12,487,656	12,185,000	8,743,842	11,604,506	11,363,812	11,660,523	12,229,990	7,500,772	10,451,364	6,050,062
July	10,780,960	9,942,264	10,341,230	12,290,250	12,155,000	8,370,426	11,399,954	10,319,277	11,387,671	11,821,349	6,795,726	10,159,544	5,718,617
Aug.	10,764,738	5,773,736	10,842,279	12,181,330	11,837,000	8,548,260	11,128,102	10,392,460	11,549,515	11,309,493	7,018,547	10,120,254	5,537,970
Sept.	10,726,618	7,678,110	10,912,540	12,229,008	11,849,000	9,295,321	10,462,577	10,050,311	11,467,224	10,541,320	7,766,905	9,618,072	5,298,622
Oct.	10,698,720	8,211,000	11,656,841	12,875,791	12,617,045	9,213,736	10,278,000	10,442,000	12,105,000	10,809,966	9,442,103	9,002,756	5,262,370
Nov.	10,008,000	8,053,140	11,398,316	12,586,509	11,614,000	8,709,090	9,494,000	9,748,000	11,654,000	9,997,000	10,057,000	7,962,000	4,685,000*
Dec.	10,438,000	8,783,805	11,878,199	12,721,577	10,960,000	8,845,511	9,215,000	10,031,000	11,812,000	9,996,000	10,180,000	7,671,000	4,685,000*
Total	131,514,000	125,442,525	133,241,185	150,798,527	145,729,045	118,783,332	128,008,000	125,333,000	137,631,000	136,341,000	111,835,000	128,829,000	73,000,000*

*Estimate
† Steel in first solid state after melting suitable for further processing or sale, including ingots, steel castings and continuous or pressure cast blooms, billets, slabs, or other product forms.

Source: American Iron and Steel Institute

Steel Prices

Composite Prices by Periods

Period	Cents per Pound
Dec. 6, 1976 to Dec. 13, 1976	14.896
Dec. 13, 1976 to June 27, 1977	15.146
June 27, 1977 to Sept. 5, 1977	15.941
Sept. 5, 1977 to Jan. 30, 1978	16.043
Jan. 30, 1978 to Feb. 27, 1978	17.301
Feb. 27, 1978 to April 3, 1978	17.393
April 3, 1978 to April 17, 1978	17.672
April 17, 1978 to July 31, 1978	17.670
July 31, 1978 to Dec. 31, 1978	18.719
Jan. 1, 1979 to April 1, 1979	19.549
April 1, 1979 to May 13, 1979	19.806
May 13, 1979 to July 1, 1979	19.668
July 1, 1979 to July 9, 1979	20.095
July 9, 1979 to Oct. 1, 1979	20.311
Oct. 1, 1979 to Jan. 6, 1980	20.547
Jan. 7, 1980 to Mar. 1, 1980	21.038
Mar. 2, 1980 to Mar. 9, 1980	21.130
Mar. 10, 1980 to Mar. 31, 1980	21.180
Apr. 1, 1980 to July 6, 1980	21.739
July 7, 1980 to Oct. 4, 1980	21.736
Oct. 5, 1980 to Nov. 30, 1980	22.019
Dec. 1, 1980 to Dec. 31, 1980	22.286
Jan. 1, 1981 to Feb. 1, 1981	22.901
Feb. 2, 1981 to Feb. 28, 1981	23.362
Mar. 1, 1981 to Mar. 28, 1981	23.598
Mar. 29, 1981 to June 20, 1981	23.776
June 21, 1981 to Sept. 26, 1981	24.486
Sept. 27, 1981 to April 3, 1982	25.195
April 4, 1982 to Dec. 31, 1982	25.297

The Iron Age Finished Steel Composite Price

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
January	6.196	6.368	6.368	6.368	6.445	6.545	6.794	7.263	7.838	9.014
February	6.196	6.368	6.368	6.368	6.448	6.545	6.904	7.351	7.838	8.998
March	6.196	6.368	6.368	6.383	6.448	6.545	6.961	7.434	8.012	8.998
April	6.196	6.368	6.368	6.383	6.448	6.545	6.961	7.504	8.055	8.998
May	6.279	6.368	6.368	6.383	6.448	6.545	7.042	7.560	8.055	8.998
June	6.279	6.368	6.368	6.376	6.448	6.545	7.042	7.813	8.234	8.998
July	6.279	6.368	6.368	6.376	6.448	6.545	7.125	7.813	8.480	8.998
August	6.279	6.368	6.368	6.376	6.448	6.767	7.252	7.813	8.728	8.998
September	6.279	6.368	6.368	6.433	6.485	6.767	7.252	7.813	8.977	8.998
October	6.368	6.368	6.368	6.445	6.496	6.767	7.252	7.813	8.977	8.998
November	6.368	6.368	6.368	6.445	6.496	6.538	7.252	7.813	8.977	8.998
December	6.368	6.368	6.368	6.445	6.510	6.538	7.263	7.813	8.977	8.998
Average	6.273	6.368	6.368	6.399	6.464	6.600	7.091	7.650	8.429	8.998

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
January	9.363	9.456	12.739	13.693	15.146	16.294	19.549	20.943	22.901	25.195
February	9.363	9.480	12.928	13.693	15.146	17.324	19.549	21.038	23.362	25.195
March	9.363	9.480	12.928	13.693	15.146	17.393	19.549	21.168	23.598	25.195
April	9.363	10.033	12.928	13.693	15.146	17.670	19.606	21.739	23.776	25.297
May	9.363	10.033	12.928	13.835	15.146	17.670	19.637	21.739	23.776	25.297
June	9.363	11.108	12.920	14.186	15.146	17.670	19.668	21.739	24.232	25.297
July	9.363	12.075	12.912	14.502	15.941	17.670	20.253	21.736	24.468	25.297
August	9.363	12.346	12.912	14.598	15.941	18.719	20.311	21.736	24.468	25.297
September	9.363	12.369	12.961	14.598	16.043	18.719	20.311	21.736	24.486	25.297
October	9.432	12.433	13.692	14.598	16.043	18.719	20.547	21.982	25.195	25.297
November	9.432	12.433	13.693	14.598	16.043	18.719	20.547	22.019	25.195	25.297
December	9.432	12.433	13.693	14.880	16.043	18.719	20.547	22.286	25.195	25.297
Average	9.380	11.141	13.102	14.213	15.577	17.940	20.006	21.655	24.224	25.271

Tinplate

Single Reduced, 70 lb.
Dollars Per Base Box, Pittsburgh

	1969	1970	1971	1972	1973	1974	1975
Jan	$7.70	$7.70	$8.85	$9.35	$9.35	$9.75	$13.70
Feb	7.70	7.70	8.85	9.35	9.35	9.75	13.70
Mar	7.70	7.70	8.85	9.35	9.75	10.15	13.70
Apr	7.70	7.95	8.85	9.35	9.75	10.15	13.70
May	7.70	8.20	8.85	9.35	9.75	10.15	13.70
June	7.70	8.20	8.85	9.35	9.75	11.30	13.70
July	7.70	8.20	8.85	9.35	9.75	11.30	13.30
Aug	7.70	8.20	8.85	9.35	9.75	11.30	13.70
Sept	7.70	8.20	8.85	9.35	9.75	11.30	13.70
Oct	7.70	8.55	8.85	9.35	9.75	11.30	13.70
Nov	7.70	8.55	8.85	9.35	9.75	13.45	13.70
Dec	7.70	8.55	8.85	9.35	9.75	13.45	13.70
Average	7.70	8.22	8.85	9.35	9.68	11.11	13.70

	1976	1977	1978	1979	1980	1981	1982
Jan	$13.70	$15.10	$17.05	$19.01	$21.93	$24.94	$26.29
Feb	13.70	15.10	17.05	19.27	21.93	24.94	26.29
Mar	15.10	15.75	17.80	19.27	21.93	24.94	26.29
Apr	15.10	15.75	17.80	20.57	23.31	24.94	26.29
May	15.10	15.75	18.00	20.57	23.31	24.94	26.29
June	15.10	15.75	18.00	20.57	23.31	24.94	26.29
July	15.10	15.75	18.00	20.57	23.31	24.94	26.29
Aug	15.10	15.75	18.00	20.57	21.31	24.94	26.29
Sept	15.10	17.05	18.00	20.57	21.31	24.94	26.29
Oct	15.10	17.05	19.10	21.93	21.31	24.94	26.29
Nov	15.10	17.05	19.10	21.93	21.31	24.94	26.29
Dec	15.10	17.05	19.10	21.93	21.31	24.94	26.29
Average	14.86	16.07	18.08	20.57	22.89	24.94	26.29

Galvanized Sheets

At Pittsburgh, Cents Per Pound†

	1971	1972	1973	1974	1975	1976
Jan	9.35	10.875	10.525	10.80	14.05	15.40
Feb	9.35	10.525	10.525	10.80	14.05	15.40
Mar	9.35	10.525	10.525	10.80	14.05	15.40
Apr	9.35	10.525	10.525	10.80	14.05	15.40
May	9.35	10.525	10.525	12.15	14.05	15.40
June	9.35	10.525	10.525	12.15	14.05	16.40
July	10.00	10.525	10.525	14.05	14.05	16.40
Aug	10.00	10.525	10.525	14.05	14.05	16.40
Sept	10.00	10.525	10.525	14.05	14.05	16.40
Oct	10.00	10.525	10.80	14.05	15.40	16.40
Nov	10.00	10.525	10.80	14.05	15.40	16.40
Dec	10.00	10.525	10.80	14.05	15.40	17.40
Average	9.68	10.554	10.50	12.65	14.39	16.07

	1977	1978	1979	1980	1981	1982
Jan	17.40	18.60	21.95	22.85	25.25	26.25
Feb	17.40	19.80	21.95	22.85	25.25	26.25
Mar	17.40	19.80	21.95	22.85	25.25	26.25
Apr	17.40	19.80	21.95	23.80	25.25	26.25
May	17.40	20.075	21.95	23.80	25.25	26.25
June	17.40	20.075	21.95	23.80	26.20	26.25
July	18.60	20.075	21.95	23.80	27.15	26.25
Aug	18.60	20.80	22.85	23.80	27.15	26.25
Sept	18.60	20.80	22.85	23.80	27.15	26.25
Oct	18.60	20.80	22.85	23.80	27.15	26.25
Nov	18.60	20.80	22.85	23.80	27.15	26.25
Dec	18.60	20.80	22.85	23.80	27.15	26.25
Average	18.00	20.18	22.32	23.56	26.30	26.25

†Hot-Dipped, 10 ga.

Hot-Rolled Strip

At Pittsburgh, Cents Per Pound

	1971	1972	1973	1974	1975	1976
Jan	7.30	8.40	8.15	8.375	11.00	11.70
Feb	7.30	8.15	8.15	8.375	11.00	11.70
Mar	7.30	8.15	8.15	8.375	11.00	11.70
Apr	7.30	8.15	8.15	8.375	11.00	11.70
May	7.30	8.15	8.15	9.50	11.00	11.70
June	7.30	8.15	8.15	9.50	11.00	11.70
July	7.75	8.15	8.15	11.00	11.00	12.45
Aug	7.75	8.15	8.15	11.00	11.00	12.45
Sept	7.75	8.15	8.15	11.00	11.00	12.45
Oct	7.75	8.15	8.375	11.00	11.70	12.45
Nov	7.75	8.15	8.375	11.00	11.70	12.45
Dec	7.75	8.15	8.375	11.00	11.70	13.25
Average	7.53	8.17	8.206	9.875	11.17	12.15

	1977	1978	1979	1980	1981	1982
Jan	13.25	14.175	16.60	17.50	19.50	20.80
Feb	13.25	14.175	16.60	17.50	19.50	20.80
Mar	13.25	14.175	16.60	17.50	19.50	20.80
Apr	13.25	14.175	16.60	18.45	19.50	20.80
May	13.25	15.275	16.60	18.45	19.50	20.80
June	13.25	15.275	16.60	18.45	20.15	20.80
July	14.175	15.275	16.60	18.45	20.80	20.80
Aug	14.175	15.80	17.50	18.45	20.80	20.80
Sept	14.175	15.80	17.50	18.45	20.80	20.80
Oct	14.175	15.80	17.50	18.45	20.80	20.80
Nov	14.175	15.80	17.50	18.45	20.80	20.80
Dec	14.175	15.80	17.50	18.45	20.80	20.80
Average	13.70	14.79	16.97	18.21	20.20	20.80

Hot-Rolled Sheets

At Pittsburgh, Cents Per Pound

	1971	1972	1973	1974	1975	1976
Jan	7.50	8.60	8.35	8.55	11.00	11.70
Feb	7.50	8.35	8.35	8.55	11.00	11.70
Mar	7.50	8.35	8.35	8.55	11.00	11.70
Apr	7.50	8.35	8.35	8.55	11.00	11.70
May	7.50	8.35	8.35	9.55	11.00	11.70
June	7.50	8.35	8.35	9.55	11.00	11.70
July	7.95	8.35	8.35	11.00	11.00	12.45
Aug	7.95	8.35	8.35	11.00	11.00	12.45
Sept	7.95	8.35	8.35	11.00	11.00	12.45
Oct	7.95	8.35	8.55	11.00	11.70	12.45
Nov	7.95	8.35	8.55	11.00	11.70	12.45
Dec	7.95	8.35	8.55	11.00	11.70	13.25
Average	7.73	8.37	8.40	9.94	11.17	12.14

	1977	1978	1979	1980	1981	1982
Jan	13.25	14.175	16.60	17.50	19.50	20.80
Feb	13.25	14.175	16.60	17.50	19.50	20.80
Mar	13.25	14.175	16.60	17.50	19.50	20.80
Apr	13.25	14.175	16.60	18.45	19.50	20.80
May	13.25	15.275	16.60	18.45	19.50	20.80
June	13.25	15.275	16.60	18.45	20.15	20.80
July	14.175	15.275	16.60	18.45	20.80	20.80
Aug	14.175	15.80	17.50	18.45	20.80	20.80
Sept	14.175	15.80	17.50	18.45	20.80	20.80
Oct	14.175	15.80	17.50	18.45	20.80	20.80
Nov	14.175	15.80	17.50	18.45	20.80	20.80
Dec	14.175	15.80	17.50	18.45	20.80	20.80
Average	13.712	15.12	16.97	18.21	20.20	20.80

Cold-Rolled Sheets

At Pittsburgh, Cents Per Pound

	1971	1972	1973	1974	1975	1976
Jan	8.95	9.25	10.075	10.30	13.00	13.90
Feb	8.95	10.075	10.075	10.30	13.00	13.90
Mar	8.95	10.075	10.075	10.30	13.00	13.90
Apr	8.95	10.075	10.075	10.30	13.00	13.90
May	8.95	10.075	10.075	11.30	13.00	13.90
June	8.95	10.075	10.075	11.30	13.00	13.90
July	9.55	10.075	10.075	13.00	13.00	14.80
Aug	9.55	10.075	10.075	13.00	13.00	14.80
Sept	9.55	10.075	10.075	13.00	13.00	14.80
Oct	9.55	10.075	10.30	13.00	13.90	14.80
Nov	9.55	10.075	10.30	13.00	13.90	14.80
Dec	9.55	10.075	10.30	13.00	13.90	15.80
Average	9.25	9.312	10.13	11.82	13.22	14.43

	1977	1978	1979	1980	1981	1982
Jan	15.80	16.90	19.75	20.75	23.15	24.65
Feb	15.80	16.90	19.75	20.75	23.15	24.65
Mar	15.80	16.90	19.75	20.75	23.15	24.65
Apr	15.80	16.90	19.75	21.90	23.15	24.65
May	15.80	18.175	19.75	21.90	23.15	24.65
June	15.80	18.175	19.75	21.90	23.90	24.65
July	16.90	18.175	19.75	21.90	24.65	24.65
Aug	16.90	18.80	20.75	21.90	24.65	24.65
Sept	16.90	18.80	20.75	21.90	24.65	24.65
Oct	16.90	18.80	20.75	21.90	24.65	24.65
Nov	16.90	18.80	20.75	21.90	24.65	24.65
Dec	16.90	18.80	20.75	21.90	24.65	24.65
Average	16.55	17.17	20.16	21.62	23.96	24.65

Structural Steel Shapes

At Pittsburgh, Cents Per Pound

	1971	1972	1973	1974	1975	1976
Jan	6.90	8.10	8.50	8.50	11.80	12.55
Feb	6.90	8.10	8.50	8.50	11.80	12.55
Mar	7.40	8.10	8.50	9.05	11.80	12.55
Apr	7.40	8.10	8.50	9.80	11.80	12.55
May	7.40	8.10	8.50	9.80	11.80	12.55
June	7.40	8.10	8.50	9.80	11.80	12.55
July	8.10	8.10	8.50	10.80	11.80	13.55
Aug	8.10	8.10	8.50	11.30	11.80	13.55
Sept	8.10	8.10	8.50	11.30	11.80	13.55
Oct	8.10	8.10	8.50	11.30	12.55	13.55
Nov	8.10	8.10	8.50	11.30	12.55	13.55
Dec	8.10	8.10	8.50	11.30	12.55	13.55
Average	7.67	8.10	8.50	10.23	11.90	13.05

	1977	1978	1979	1980	1981	1982
Jan	13.55	14.55	17.00	18.00	19.90	22.90
Feb	13.55	14.55	17.00	18.00	19.90	22.90
Mar	13.55	14.55	17.00	18.90	19.90	22.90
Apr	13.55	14.55	17.00	18.90	21.65	23.90
May	13.55	15.725	17.15	18.90	21.65	23.90
June	13.55	15.725	17.30	18.90	21.65	23.90
July	13.55	15.725	17.30	18.90	21.65	23.90
Aug	13.55	16.25	17.30	18.90	21.65	23.90
Sept	14.55	16.25	17.30	18.90	21.65	23.90
Oct	14.55	16.25	18.00	19.90	22.90	23.90
Nov	14.55	16.25	18.00	19.90	22.90	23.90
Dec	14.55	16.25	18.00	19.90	22.90	23.90
Average	13.88	15.58	17.36	19.00	21.52	23.65

Composite Pig Iron Price

Average of Iron Age quotes on basic and foundry iron per net ton.

	1977	1978	1979	1980	1981	1982
Jan	$187.67	$191.75	$203.00	$203.00	$203.00	$213.00
Feb	187.67	191.75	203.00	203.00	203.00	213.00
Mar	187.67	191.75	203.00	203.00	203.00	213.00
Apr	187.67	191.75	203.00	203.00	203.00	213.00
May	187.67	191.75	203.00	203.00	203.00	213.00
June	187.67	203.00	203.00	203.00	203.00	213.00
July	187.67	203.00	203.00	203.00	203.00	213.00
Aug	191.75	203.00	203.00	203.00	203.00	213.00
Sept	191.75	203.00	203.00	203.00	203.00	213.00
Oct	191.75	203.00	203.00	203.00	203.00	213.00
Nov	191.75	203.00	203.00	203.00	213.00	213.00
Dec	191.75	203.00	203.00	203.00	213.00	213.00
Average	$189.57	$198.31	$203.00	$203.00	$204.66	$213.00

Special Quality Bars

At Pittsburgh, Cents Per Pound

	1977	1978	1979	1980	1981	1982
Jan	15.10	16.15	19.10	21.00	22.80	23.95
Feb	15.10	16.15	19.10	21.00	22.80	23.95
Mar	15.10	16.15	19.10	21.00	22.80	23.95
Apr	15.10	16.15	19.10	21.00	22.80	23.95
May	15.10	17.525	19.10	21.00	22.80	23.95
June	15.10	17.525	19.10	21.00	23.95	23.95
July	16.15	17.525	19.10	21.00	23.95	23.95
Aug	16.15	18.15	19.85	21.00	23.95	23.95
Sept	16.15	18.15	19.85	21.00	23.95	23.95
Oct	16.15	18.15	19.85	21.00	23.95	23.95
Nov	16.15	18.15	19.85	22.80	23.95	23.95
Dec	16.15	18.15	19.85	22.80	23.95	23.95
Average	15.62	17.33	19.41	21.30	23.29	23.95

Steel Plates

At Pittsburgh, Cents Per Pound

	1977	1978	1979	1980	1981	1982
Jan	14.10	15.10	17.85	19.45	21.50	24.25
Feb	14.10	15.10	17.85	19.45	21.50	24.25
Mar	14.10	15.10	17.85	19.45	23.25	24.25
Apr	14.10	15.10	17.85	20.70	23.25	24.25
May	14.10	16.425	18.17	20.70	23.25	24.25
June	14.10	16.425	18.50	20.70	23.25	24.25
July	15.10	16.425	18.50	20.70	23.25	24.25
Aug	15.10	17.05	18.50	20.70	23.25	24.25
Sept	15.10	17.05	18.50	20.70	23.25	24.25
Oct	15.10	17.05	19.45	21.50	24.25	24.25
Nov	15.10	17.05	19.45	21.50	24.25	24.25
Dec	15.10	17.05	19.45	21.50	24.25	24.25
Average	14.60	16.24	18.49	20.62	23.20	24.25

Steel Scrap

Philadelphia

*Estimate

Prices of No. 1 Scrap, Per Gross Ton

	1977	1978	1979	1980	1981	1982
Jan	$74.50	$68.70	$101.10	$100.50	$95.75	$75.25
Feb	74.50	72.75	110.75	108.00	91.50	75.50
Mar	74.00	76.00	110.25	101.50	91.50	72.90
Apr	71.50	74.75	97.70	92.75	90.00	71.50
May	64.50	71.10	90.75	82.50	84.50	65.00
June	62.50	74.30	93.08	76.10	79.50	60.30
July	61.75	78.00	91.50	83.00	79.50	59.50
Aug	61.10	78.00	89.25	88.25	79.30	59.50
Sept	59.00	75.50	88.50	91.90	78.50	59.50
Oct	48.10	76.30	87.30	91.50	69.50	57.00
Nov	50.25	84.00	88.50	91.50	66.50	54.70
Dec	56.00	91.50	92.70	96.50	66.50	54.50*
Average	63.14	76.74	95.10	92.00	81.05	63.76*

No. 2 Bundles

*Estimate

	1977	1978	1979	1980	1981	1982
Jan	$48.50	$46.90	$60.10	$72.00	$64.00	$43.50
Feb	46.50	51.25	66.50	76.25	60.75	43.50
Mar	48.50	53.50	72.25	71.50	60.50	43.50
Apr	48.50	51.75	62.70	64.75	60.50	41.50
May	48.10	47.30	64.50	53.25	57.50	40.50
June	45.50	50.10	66.50	51.10	54.50	40.10
July	45.50	51.50	66.50	56.00	54.50	39.50
Aug	45.30	51.50	61.50	63.00	54.30	39.50
Sept	44.50	49.50	59.25	65.10	51.50	39.50
Oct	34.70	48.70	58.50	64.50	46.00	39.50
Nov	34.75	55.50	60.00	64.50	39.30	39.50
Dec	38.50	56.50	66.30	63.50	37.50	39.50*
Average	44.23	51.17	63.71	63.93	53.41	40.80*

Chicago

*Estimate

Prices of No. 1 Scrap, Per Gross Ton

	1977	1978	1979	1980	1981	1982
Jan	$69.50	$71.50	$ 98.30	$ 96.50	$ 95.50	$83.25
Feb	69.50	71.50	109.75	100.50	101.25	79.50
Mar	71.00	72.25	121.25	96.50	108.10	71.70
Apr	70.25	76.00	99.30	86.00	104.50	67.00
May	64.10	71.50	99.75	70.50	96.75	58.50
June	58.75	75.30	104.00	63.50	88.50	52.30
July	57.50	77.75	96.90	67.50	88.50	49.50
Aug	57.50	74.00	88.25	77.50	97.50	50.70
Sept	55.00	69.50	86.50	88.50	91.25	51.50
Oct	47.30	72.50	87.30	93.75	81.00	46.50
Nov	45.75	83.00	94.50	98.75	75.50	46.50
Dec	62.25	91.25	93.90	105.10	75.50	48.50*
Average	60.70	75.50	98.30	87.05	91.99	58.62*

No. 2 Bundles

*Estimate

	1977	1978	1979	1980	1981	1982
Jan	$47.50	$46.50	$64.50	$54.50	$77.00	$85.50
Feb	47.75	46.75	67.50	58.50	80.25	62.50
Mar	48.75	48.50	68.75	57.50	83.70	56.50
Apr	48.50	51.50	59.90	53.25	83.25	52.50
May	43.30	51.10	63.00	49.50	73.25	47.50
June	39.75	49.30	61.50	48.30	64.50	43.90
July	37.50	50.00	53.50	51.50	65.75	41.50
Aug	38.90	48.00	49.50	61.50	68.70	41.50
Sept	38.50	46.50	50.25	72.10	69.00	41.50
Oct	34.70	48.50	52.50	81.75	60.50	38.50
Nov	34.75	54.50	56.50	87.50	60.50	38.50
Dec	44.00	59.75	57.30	86.50	63.25	38.50*
Average	41.99	50.07	58.72	63.24	70.81	47.36*

Pittsburgh

*Estimate

Prices of No. 1 Scrap, Per Gross Ton

	1977	1978	1979	1980	1981	1982
Jan	$72.50	$71.50	$ 93.30	$102.00	$104.50	$94.50
Feb	73.00	72.00	111.75	106.50	105.75	91.50
Mar	75.50	74.50	127.75	105.50	116.10	85.90
Apr	74.00	77.50	102.90	98.00	110.75	75.50
May	67.30	73.10	102.75	79.50	105.10	64.50
June	64.50	74.70	105.50	69.50	100.00	61.50
July	64.50	77.50	99.90	77.75	102.50	59.00
Aug	65.50	77.00	93.50	87.50	107.10	57.50
Sept	63.00	73.75	89.25	102.90	101.50	57.50
Oct	51.90	75.70	87.30	102.50	93.00	55.25
Nov	52.50	83.25	94.50	105.25	84.90	52.50
Dec	63.50	87.00	95.70	103.10	87.25	52.50*
Average	65.64	76.45	100.34	95.00	101.54	67.30*

No. 2 Bundles

*Estimate

	1977	1978	1979	1980	1981	1982
Jan	$51.90	$50.30	$60.10	$61.00	$74.50	$60.50
Feb	50.00	49.75	70.50	67.50	74.50	62.50
Mar	53.00	49.50	78.75	68.70	77.30	53.70
Apr	53.75	50.25	67.70	64.50	81.50	48.75
May	46.90	47.10	69.75	58.75	73.50	46.50
June	42.50	47.70	74.50	52.70	65.70	44.50
July	42.50	52.00	68.30	54.50	64.50	44.50
Aug	46.50	49.75	64.75	63.50	64.50	44.50
Sept	42.50	46.50	62.75	66.50	64.50	42.50
Oct	38.90	46.30	59.30	66.50	63.00	40.25
Nov	38.50	51.00	59.25	69.75	60.50	38.10
Dec	46.50	55.25	59.50	73.90	60.50	37.50*
Average	46.12	49.61	66.26	63.98	68.71	46.98*

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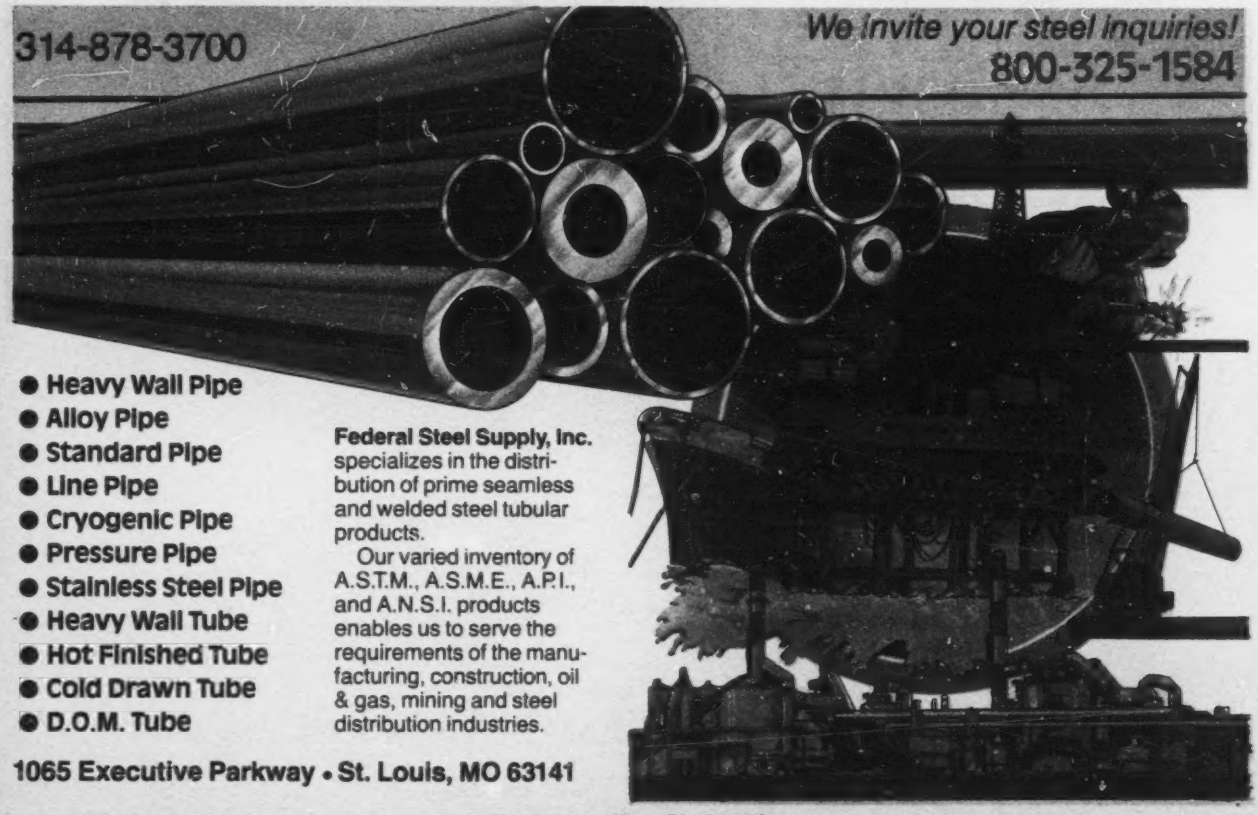

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Scrap Composites

Average of Iron Age Scrap Prices Pittsburgh, Chicago, Philadelphia, Gross Ton

No. 1 Heavy Melting

*Estimate

	1977	1978	1979	1980	1981	1982
Jan	$72.17	$70.56	$ 97.56	$ 99.67	$ 98.58	$84.34
Feb	72.33	72.08	110.75	105.00	99.50	82.17
Mar	73.50	74.25	119.75	101.17	105.23	76.83
Apr	71.92	76.08	99.96	92.25	101.75	71.33
May	65.30	71.90	97.75	77.50	95.42	62.67
June	61.91	74.76	100.83	89.70	89.37	58.03
July	61.25	77.25	96.10	76.08	90.17	56.00
Aug	61.37	76.33	90.33	84.42	94.63	55.90
Sept	58.83	72.91	88.08	94.43	90.42	56.17
Oct	49.10	74.83	87.30	95.91	81.17	52.92
Nov	49.50	83.41	92.50	98.50	75.83	51.23
Dec	60.59	89.91	94.10	101.57	76.42	51.17*
Average	63.15	76.23	97.91	91.35	91.53	63.23*

No. 2 Bundles

*Estimate

	1977	1978	1979	1980	1981	1982
Jan	$49.30	$47.90	$61.56	$62.50	$71.83	$56.50
Feb	48.75	49.25	66.17	67.41	71.83	56.17
Mar	50.08	50.50	73.25	65.90	73.83	51.23
Apr	50.25	51.17	63.43	60.83	75.08	47.58
May	46.03	48.50	65.75	53.83	68.08	44.83
June	42.58	49.03	67.50	50.70	61.57	42.83
July	41.83	51.16	62.76	54.00	61.58	41.83
Aug	43.56	49.75	58.58	62.66	62.50	41.83
Sept	41.83	47.50	57.41	67.90	61.66	41.47
Oct	36.10	47.83	56.76	70.91	56.50	39.42
Nov	36.00	53.66	58.58	72.75	53.43	38.70
Dec	43.00	57.16	61.03	75.23	53.75	38.50*
Average	44.11	50.28	62.89	63.71	64.31	45.05*

Iron Ore

Pig Iron, Production

Net Tons

Year	Basic	Bessemer	Low phosphorous	Foundry	Malleable	All Other, incl. Direct Castings Silvery Pig Iron	Total Pig Iron
1971	77,341,000	1,215,000	145,000	1,214,000	1,336,000	48,000	81,299,000
1972	83,991,000	1,336,000	105,000	1,533,000	2,186,000	370,000	88,942,000
1973	96,202,000	1,242,000	101,000	1,561,000	1,352,000	359,000	100,837,000
1974	91,193,000	1,160,000	106,000	1,528,000	1,382,000	800,000	95,909,000
1975	75,911,000	1,087,000	140,000	1,321,000	814,000	650,000	79,923,000
1976	82,884,000	1,150,000	112,000	1,489,000	800,000	425,000	86,984,000
1977	78,198,000	254,000	122,000	1,810,000	990,000	454,000	81,328,000
1978	84,497,000	295,000	110,000	1,856,000	471,000	450,000	87,679,000
1979	84,047,000	12,000	178,000	1,457,000	1,003,000	306,000	87,003,000
1980	66,964,000	39,000	72,000	713,000	799,000	134,000	68,721,000
1981	71,166,000	58,000	132,000	1,221,000	929,000	66,000	73,750,000
1982†	.....	.....	.....	.....	.....	.....	48,000,000

†Iron Age estimate.

Source American Iron and Steel Institute

Supply of Iron Ore in the United States

Year	Domestic Shipments	Exports	Imports	Net Supply*
1974	85,112,000	2,323,235	48,029,108	130,817,873
1975	80,267,092	2,537,451	46,742,190	124,471,831
1976	86,646,674	2,997,333	43,933,333	127,582,674
1977	67,050,341	2,143,047	37,904,705	102,811,999
1978	83,207,000	4,213,194	33,616,378	112,610,184
1979	92,053,933	5,147,657	33,776,072	120,682,348
1980	72,628,819	5,689,198	25,058,200	91,997,821
1981	66,302,487	5,545,518	28,333,974	89,090,943
1982**	40,409,588	2,822,475	15,461,063	53,048,276

*Domestic shipments minus exports, plus imports. **Estimate

Source: American Iron Ore Association

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Nonferrous Prices and Production

U.S. Production of Primary Aluminum
Short tons

	1975	1976	1977	1978
Jan	304,126	322,411	399,030	399,874
Feb	324,361	302,791	351,686	366,437
Mar	347,202	326,210	379,025	395,209
Apr	326,035	324,859	371,310	387,324
May	327,153	349,672	382,489	405,317
June	301,713	345,425	369,145	394,863
July	310,192	364,738	381,888	408,033
Aug	308,410	371,185	376,289	410,130
Sept	300,011	366,447	366,735	399,136
Oct	311,391	390,902	386,029	415,513
Nov	309,667	386,518	380,179	403,454
Dec	318,866	400,219	394,905	418,487
Total	3,879,147	4,251,377	4,538,710	4,803,777

	1979	1980	1981	1982
Jan	418,285	430,924	444,826	350,548
Feb	379,405	406,396	404,225	310,405
Mar	419,218	434,260	447,655	336,276
Apr	401,786	421,105	431,189	318,619
May	423,377	437,938	441,356	320,897
June	410,444	424,510	419,802	299,914
July	426,424	426,572	425,115	296,986
Aug	430,192	426,054	416,140	287,077
Sept	419,248	418,945	393,012	271,147
Oct	434,767	436,676	395,585	275,277
Nov	423,244	427,394	364,375	264,800*
Dec	434,702	438,929	364,165	273,110*
Total	5,023,092	5,129,703	4,947,925	3,604,856

Source: Aluminum Association *IA Estimate

U.S Production of Slab Zinc Short tons

	1978	1979	1980	1981	1982
Jan	39,201	45,714	30,511	33,445	26,706
Feb	32,982	46,113	30,613	31,457	23,545
Mar	30,392	52,916	34,777	34,450	23,639
Apr	33,482	51,130	32,123	34,051	21,314
May	35,656	49,870	31,922	32,218	23,656
June	34,506	42,953	28,452	30,828	23,713
July	34,456	44,016	20,774	33,018	20,570
Aug	37,591	41,973	26,703	33,534	22,433
Sept	37,345	39,796	28,613	29,424	26,549
Oct	44,163	46,005	30,990	29,778	27,348
Nov	42,429	43,427	29,884	29,276	26,800*
Dec	42,587	42,000*	33,247	25,301	28,000*
Total	444,790	537,427	358,809	376,780	294,573*
Average	37,066	44,786	29,884	31,398	24,548*

Source: ABMS. *Estimate.

U.S Production of Refined Lead
Short tons

	1978	1979	1980	1981	1982
Jan	59,996	52,980	56,879	57,984	50,527
Feb	50,061	52,237	49,324	53,569	45,193
Mar	55,256	60,632	54,058	58,170	43,994
Apr	55,466	52,493	47,493	52,741	36,111
May	49,057	58,065	47,044	35,038	54,323
June	44,825	55,026	47,142	24,378	52,974
July	42,450	52,606	52,037	33,027	44,224
Aug	50,362	49,878	48,173	45,097	46,362
Sept	51,487	45,400	50,158	43,704	49,201
Oct	60,872	52,936	52,156	46,082	50,574
Nov	55,110	54,598	48,438	39,412	40,000*
Dec	54,249	54,252	53,456	44,036	42,000*
Total	629,191	641,113	606,358	533,238	555,213*
Average	52,432	53,426	50,530	44,437	46,268*

Source: ABMS. *Estimate.

Electrolytic Copper
Cents Per Pound

	1971	1972	1973	1974	1975	1976
Jan	51.48	50.35	53.12	68.70	70.50	63.00
Feb	50.37	50.25	56.12	68.70	63.00	63.00
Mar	50.58	52.63	60.12	68.70	63.00	64.50
Apr	52.87	52.63	60.12	68.70	63.00	68.00
May	52.87	52.63	60.12	81.20	63.00	70.00
June	52.87	52.63	60.12	86.10	62.25	70.00
July	52.87	50.63	60.12	86.30	61.50	74.00
Aug	52.87	50.63	60.12	86.70	63.00	74.00
Sept	52.87	50.63	60.12	83.00	63.00	74.00
Oct	52.87	50.63	60.12	78.25	63.00	72.00
Nov	52.19	50.63	60.12	75.80	63.00	70.00
Dec	50.37	50.63	68.00	73.00	63.00	65.00
Average	52.09	51.24	59.86	77.00	63.44	68.95

	1977	1978	1979	1980	1981	1982
Jan	65.20	62.75	75.63	116.95	88.55	79.54
Feb	67.50	62.25	89.36	134.17	86.01	79.41
Mar	70.63	61.62	97.75	105.97	85.74	76.34
Apr	74.00	64.00	90.50	94.57	88.15	76.87
May	72.80	64.33	89.50	92.91	85.99	78.86
June	69.88	65.23	86.39	92.32	85.11	71.67
July	68.75	63.50	85.95	102.38	83.99	71.64
Aug	64.00	66.47	90.24	101.29	88.32	71.82
Sept	60.00	66.83	92.36	98.78	84.90	71.87
Oct	60.00	69.54	97.72	98.91	83.03	71.94
Nov	60.00	71.20	98.49	96.02	81.93	71.04*
Dec	61.29	71.50	106.10	88.13	80.97	72.00*
Average	66.17	65.77	92.12	101.90	85.31	74.42*

*Estimate

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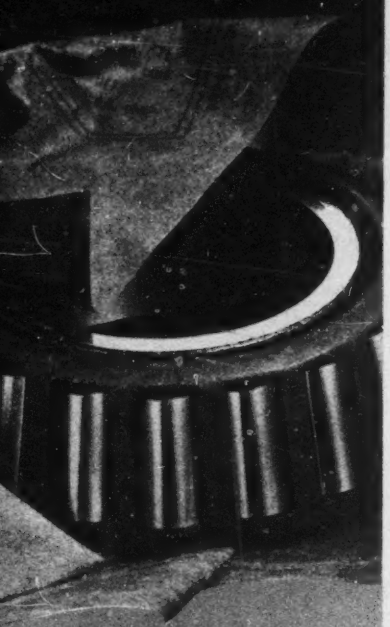

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COATED PRODUCTS, INC.
1200 Jorie Blvd.
Oak Brook, IL 60521 312-986-4600
For Information, Circle 119

ANNUAL STATISTICAL REVIEW

Nonferrous Prices and Production

U.S Production of Refined Copper
In tons of 2000 pounds.

	1978	1979	1980	1981	1982
Jan	129,000	135,600	161,000	133,500	117,500
Feb	112,500	135,800	149,500	116,300	123,400
Mar	143,200	152,200	162,300	152,200	121,500
Apr	141,000	149,800	170,400	155,800	116,400
May	145,300	154,600	158,700	135,000	107,500
June	135,100	149,400	167,200	158,300	106,600
July	96,100	132,300	52,400	131,700	81,800
Aug	138,900	144,900	26,700	124,000	77,600
Sept	144,900	137,500	27,300	140,500	80,600
Oct	163,400	148,700	61,000	127,300	83,300
Nov	162,400	145,000	85,800	124,900	80,000*
Dec	133,300	33,514	136,900	147,900	85,000*
Total	1,567,100	1,765,300	1,361,200	1,647,400	1,183,200*
Aver	125,592	147,192	113,433	137,283	98,600*

Source: ABMS. *Estimate.

Lead, Common Grade Price
Cents Per Pound

	1976	1977	1978	1979	1980	1981	1982
Jan	19.00	26.50	33.00	40.58	51.29	34.13	29.95
Feb	19.00	26.67	33.00	43.75	50.00	30.68	28.00
Mar	20.00	30.50	33.00	46.00	49.55	35.28	26.00
Apr	21.88	31.00	33.00	48.00	45.45	37.63	26.50
May	22.88	31.00	31.23	49.76	36.00	37.00	26.50
June	23.00	31.00	31.00	57.62	34.25	38.25	25.80
July	24.17	31.00	31.00	58.60	35.77	41.25	27.90
Aug	24.75	31.00	32.40	57.97	40.97	44.63	27.90
Sept	24.75	31.00	34.30	58.60	42.40	42.50	26.75
Oct	25.50	31.00	37.00	60.74	45.00	37.63	26.00
Nov	25.50	32.00	38.00	58.27	44.00	34.46	23.70*
Dec	25.50	33.00	38.00	57.02	39.00	31.86	24.00*
Average	22.99	30.64	33.74	53.08	42.81	37.11	26.79*

*Estimate

Aluminum 99.5 Pct Ingot
Cents Per Pound, Freight Allowed

	1971	1972	1973	1974	1975	1976
Jan	29.00	29.00	25.00	29.00	39.00	41.00
Feb	29.00	29.00	25.00	29.00	39.00	41.00
Mar	29.00	29.00	25.00	29.24	39.00	41.00
Apr	29.00	29.00	25.00	31.50	39.00	41.75
May	29.00	27.00	25.00	31.50	39.00	44.00
June	29.00	25.00	25.00	33.40	39.00	44.00
July	29.00	25.00	25.00	33.50	39.00	44.00
Aug	29.00	25.00	25.00	35.94	41.00	47.00
Sept	29.00	25.00	25.00	38.70	41.00	48.00
Oct	29.00	25.00	25.00	39.00	41.00	48.00
Nov	29.00	25.00	25.00	39.00	41.00	48.00
Dec	29.00	25.00	27.00	39.00	41.00	48.00
Average	29.00	26.50	25.17	34.00	39.83	44.65

	1977	1978	1979	1980	1981	1982†
Jan	48.00	53.00	55.25	66.25	76.00	76.00
Feb	48.00	53.00	58.00	66.25	76.00	76.00
Mar	48.00	53.00	58.00	66.25	76.00	76.00
Apr	51.00	53.00	59.50	72.00	76.00	76.00
May	51.00	55.25	59.50	72.00	78.00	76.00
June	51.00	55.25	59.50	72.00	78.00	76.00
July	53.00	55.25	62.75	72.00	78.00	76.00
Aug	53.00	55.25	62.75	72.00	78.00	76.00
Sept	53.00	55.25	62.75	72.00	78.00	76.00
Oct	53.00	55.25	66.25	76.00	78.00	76.00
Nov	53.00	55.25	66.25	76.00	78.00	76.00
Dec	53.00	55.25	66.25	76.00	78.00	76.00
Average	51.25	54.50	61.40	71.56	77.33	76.00†

†Nominal

Zinc Prices
1971-81 Prime Western
1982—High Grade†
Cents Per Pound

	1971	1972	1973	1974	1975	1976
Jan	15.00	17.00	19.50	31.18	39.00	37.68
Feb	15.00	17.00	19.50	31.75	39.00	37.00
Mar	15.06	17.50	19.63	32.70	38.75	37.00
Apr	15.50	17.50	20.38	34.75	38.75	37.00
May	15.77	18.00	20.38	34.75	38.75	37.00
June	16.00	18.50	20.38	35.25	38.75	37.00
July	16.19	18.50	20.38	36.97	38.75	37.00
Aug	17.00	18.50	20.38	38.00	38.75	37.00
Sept	17.00	18.50	20.38	38.95	38.75	37.00
Oct	17.00	18.50	20.38	39.00	38.75	37.00
Nov	17.00	19.50	20.38	39.00	38.75	37.00
Dec	17.00	20.00	30.00	39.00	38.75	37.00
Average	16.13	18.25	20.97	35.94	38.79	37.06

	1977	1978	1979	1980	1981	1982†
Jan	37.00	30.50	35.00	37.50	41.25	42.60
Feb	37.00	30.07	36.89	38.67	41.63	43.00
Mar	37.00	29.00	38.05	38.92	43.63	43.00
Apr	37.00	29.00	38.50	38.50	43.75	35.75
May	36.40	29.00	38.50	37.50	46.50	36.00
June	34.00	29.90	38.57	36.50	46.63	35.80
July	34.00	30.00	39.64	35.50	48.63	38.50
Aug	34.00	31.88	36.81	35.97	49.75	39.50
Sept	34.00	32.75	36.07	36.60	49.75	41.00
Oct	32.80	33.75	37.50	37.50	46.50	41.00
Nov	31.17	34.75	37.08	38.60	46.75	40.25*
Dec	30.50	34.75	37.50	40.50	43.75	40.00*
Average	34.57	31.28	37.51	37.70	45.54	39.70*

*Estimate.

Straits Tin, Spot Price
(cents per pound†)

	1977	1978	1979	1980	1981	1982
Jan	425.14	544.94	624.18	758.95	643.35	696.66
Feb	469.01	549.89	660.84	785.67	617.29	660.43
Mar	480.47	514.96	684.35	812.18	607.75	589.40
Apr	445.42	497.24	678.60	785.72	597.65	570.95
May	451.87	526.96	683.46	784.62	568.09	583.13
June	446.53	555.12	697.82	756.62	569.28	566.40
July	460.35	559.52	699.59	752.11	591.87	561.69
Aug	519.77	592.37	678.57	751.51	652.76	564.06
Sept	517.76	627.15	697.18	778.59	675.15	572.26
Oct	573.83	681.05	714.24	744.38	698.17	556.11
Nov	579.95	691.11	724.99	697.21	709.45	534.37
Dec	567.81	636.69	752.17	655.05	708.72	536.00*
Average	496.49	581.40	691.33	N.A.	636.63	582.52*

† U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo, beginning June, 1980. Prior prices are C.I.F., New York, based on Penang picul price.

N.A.—Not Applicable *Estimate

Electrolytic Nickel
Cents Per Pound, New York, Duty Paid

Oct. 1, 1976 to July 25, 1977	241.00
Published price suspended through Feb. 1, 1979	
Feb. 2, 1979 to Mar. 13, 1979	210.00
Mar. 14, 1979 to April 10, 1979	230.00
April 11, 1979 to May 13, 1979	255.00
May 14, 1979 to June 6, 1979	290.00
June 7, 1979 to Dec. 4, 1979	305.00
Dec. 5, 1979 to Feb. 27, 1980	325.00
Feb. 28, 1980 to Nov. 24, 1981	350.00
Nov. 25, 1981 to	329.00

Source: Inco, Inc.

MATERIALS NEWSFRONT

Price & Production Data

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age will publish only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks will continue to be available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter. (For details on these services see ad on p. 80.)

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective December 20, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	1,057	1,027	70,679	116,301
Capability Utilization Rate	35.8	34.7	47.6	78.1

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron* * (Net ton= 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 52.17	$ 51.17	$ 51.17	$ 75.50
No. 2 bundles	$ 38.50	$ 38.50	$ 38.50	$ 52.50
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh .	$ 52.50	$ 52.50	$ 52.50	$ 85.50
No. 1 steel, Philadelphia	54.50	54.50	54.50	66.50
No. 1 steel, Chicago.....	49.50	46.50	46.50	74.50
No. 1 bundles, Detroit..	41.50	41.50	41.50	74.50
Low Phos., Youngstown	51.50	51.50	52.50	85.50
No. 1 mach'y cast., Pgh	61.50	61.50	61.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	111.50
No. 1 mach'y cast., Chi	104.50	103.50	103.50	117.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective December 20, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	70.00-71.00	70.00-71.50	12/14/82
Lead	19.50-23.00	20.50-23.00	12/10/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	36.00-40.00	38.00-40.00	12/8/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.25-$1.40
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $440.25
Indium, dollars per troy oz..... $2.60-$2.85
Iridium, dollars per troy oz..... $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. . . $365-$385
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz..... $10.54
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Dec. 13—558.91 Dec. 16—561.95
Dec. 14—559.70 Dec. 17—561.95
Dec. 15—559.57

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	67⅛	57¼
Yellow brass	58	52⅞
Red brass	61¾	54⅞
Comm. bronze	63	56
Mang. bronze	57½	55¾
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	56
No. 2 copper wire	50
Light copper	40

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	52
No. 2 copper wire	46
Light copper	37
No. 1 composition	50
No. 1 comp. turnings	47
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	26
Radiators	41

Aluminum

New mixed clips	24	—25
Old sheet	23	—24
Old cast	23	—24
Clean dry borings	23	—24

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	22	—23
Mixed L.C. clips	20	—21
Old sheets and cast	14	—15
Borings and turnings	10	—11
Duraluminum clippings	20	—21

Copper and Brass

No. 1 copper wire	46	—47
No. 2 copper wire	39	—40
Light copper	34	—35
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	26	—27
Brass Pipe	28	—29
New soft brass clippings	34	—35

Lead

Heavy soft lead	9	—10
Whole batteries	4	— 5
Type metal	14	—15
Electrotype	18	—19

Nickel

Nickel solids	85	— 90
Nickel rod ends	85	— 90
Nickel sheets, clips	85	— 90
Nickel turnings	40	— 45

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

EFFECTIVE DECEMBER 20, 1982

MATERIALS NEWSFRONT

(Effective December 20, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 52.00 to $ 53.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 dealer bundles	65.00 to 66.00
No. 1 factory bundles (auto)	61.00 to 62.00
No. 2 bundles	37.00 to 38.00
No. 1 busheling	58.00 to 59.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	18.00 to 19.00
Low phos. punchings plate	67.00 to 68.00
Heavy turnings	45.00 to 46.00
No. 1 RR hvy. melting	64.00 to 65.00
Rails 2 ft. and under	76.00 to 77.00
Scrap rails, random lgth.	73.00 to 74.00
RR specialties	65.00 to 66.00
No. 1 machinery cast	61.00 to 62.00
Cupola cast	54.00 to 55.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	410.00 to 420.00
18-8 turnings	310.00 to 320.00

Chicago

No. 1 hvy. melting	$ 49.00 to $ 50.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	60.00 to 61.00
No. 1 factory bundles (auto)	65.00 to 66.00
No. 2 dealer bundles	38.00 to 39.00
No. 1 busheling	59.00 to 60.00
Shredder scrap	58.00 to 59.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	33.00 to 34.00
Low phos. forge crop	76.00 to 77.00
Low phos. punchings plate ⅛ in. and heavier	80.00 to 81.00
Low phos. 2 ft. and under	76.00 to 77.00
No. 1 RR hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	49.00 to 50.00
Reroller rails	87.00 to 88.00
Rails, 2 ft. and under	76.00 to 77.00
RR couplers and knuckles	70.00 to 71.00
RR car axles	99.00 to 100.00
No. 1 machinery cast	104.00 to 105.00
Cupola cast	90.00 to 91.00
Stove plate	78.00 to 79.00
Steel car wheels	57.00 to 58.00
Stainless	
18-8 bundles and solids	380.00 to 390.00
18-8 turnings	280.00 to 290.00
430 bundles and solids	90.00 to 95.00
430 turnings	65.00 to 70.00

Philadelphia

No. 1 hvy. melting	$ 53.00 to $ 56.00
No. 2 hvy. melting	48.00 to 51.00
No. 1 dealer bundles	67.00 to 70.00
No. 2 dealer bundles	38.00 to 41.00
No. 1 busheling	67.00 to 70.00
Shredder scrap	65.00 to 68.00
Machine shop turn.	18.00 to 21.00
Mixed bor. and turn.	18.00 to 21.00
Shoveling turnings	31.00 to 34.00
Clean cast chemical borings	40.00 to 43.00
Low phos. 5 ft. and under	64.00 to 67.00
Low phos. 2 ft. punchings	85.00 to 88.00
Electric furnace bundles	75.00 to 78.00
RR specialties	74.00 to 77.00
Rails, 2 ft. and under	89.00 to 92.00
Cupola cast	56.00 to 59.00
Heavy breakable cast	53.00 to 56.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 36.00 to $ 37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	40.00 to 41.00
Drop forge flashings	21.00 to 22.00
Machine shop turn.	14.00 to 15.00
Mixed borings and turn.	7.00 to 8.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	5.00 to 6.00
Heavy breakable cast	24.00 to 25.00
Mixed cupola cast	40.00 to 41.00
Automobile cast	58.00 to 59.00
Stainless	
18-8 bundles and solids	395.00 to 405.00
18-8 turnings	285.00 to 295.00
430 bundles and solids	70.00 to 80.00

Youngstown

No. 1 hvy. melting	$ 44.00 to $ 45.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	50.00 to 51.00
No. 2 dealer bundles	29.00 to 30.00
Machine shop turn.	2.00 to 3.00
Shoveling turnings	7.00 to 8.00
Low phos. plate	51.00 to 52.00
Electric furnace bundles	51.00 to 52.00
Galvanized bundles	41.00 to 42.00

Cleveland

No. 1 hvy. melting	$ 42.00 to $ 43.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	46.00 to 47.00
No. 1 factory bundles	51.00 to 52.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	47.00 to 48.00
Machine shop turn.	2.00 to 3.00
Mixed bor. and turn.	2.00 to 3.00
Shoveling turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Cut structural & plates, 2 ft. and under	68.00 to 69.00
Low phos. punchings plate	68.00 to 69.00
Drop forge flashings	33.00 to 34.00
Foundry steel, 2 ft. & under	59.00 to 60.00
No. 1 RR hvy melting	63.00 to 64.00
Rails, 2 ft. and under	82.00 to 83.00
Rails, 18 in. and under	83.00 to 84.00
Steel axle turnings	69.00 to 70.00
Railroad cast	82.00 to 83.00
No. 1 machinery cast	79.00 to 80.00
Cupola cast	62.00 to 63.00
Stove plate	47.00 to 48.00
Stainless	
18-8 bundles	300.00 to 310.00
18-8 turnings	250.00 to 260.00
430 bundles	75.00 to 85.00

Buffalo

No. 1 hvy. melting	$ 25.00 to $ 26.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 busheling	30.00 to 31.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	12.00 to 13.00
Machine shop turn.	1.00 to 2.00
Mixed bor. and turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	8.00 to 9.00
Low phos. plate	48.00 to 49.00
Structural and plate, 2 ft. and under	46.00 to 47.00
Rails, 2 ft. and under	42.00 to 43.00
Scrap rails, random lgth.	22.00 to 23.00
No. 1 machinery cast	63.00 to 64.00
No. 1 cupola cast	42.00 to 43.00

St. Louis

No. 1 hvy. melting	$ 47.00 to $ 48.00
No. 2 hvy. melting	39.00 to 40.00
Foundry steel, 2 ft.	39.00 to 40.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	36.00 to 37.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	30.00 to 31.00
No. 1 RR hvy. melting	47.00 to 48.00
Rails, random length	49.00 to 50.00
Rails, 18 in. and under	64.00 to 65.00
RR specialties	80.00 to 81.00
Cupola cast	70.00 to 71.00
Heavy breakable cast	48.00 to 49.00
Stove plate	70.00 to 71.00
Cast iron car wheels	49.00 to 50.00
Rerolling rails	84.00 to 85.00
Unstripped motor blocks	55.00 to 56.00

Birmingham

No. 1 heavy melting	$ 54.00 to $ 55.00
No. 2 heavy melting	52.00 to 53.00
No. 1 dealer bundles	54.00 to 55.00
No. 2 bundles	40.00 to 41.00
No. 1 busheling	54.00 to 55.00
Shredder scrap	71.00 to 72.00
Machine shop. turn.	18.00 to 19.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	26.00 to 27.00
Electric furnace bundles	53.00 to 54.00
Elec. furnace, 3 ft. & under	50.00 to 51.00
Structural and plate, 2 ft.	70.00 to 71.00
Structural and plate, 4 ft.	65.00 to 66.00
No. 1 RR hvy. melting	54.00 to 55.00
Scrap rails, random lgth.	52.00 to 53.00
Rails, 18 in. and under	74.00 to 75.00
Angles and splice bars	65.00 to 66.00
No. 1 cupola cast	74.00 to 75.00
Unstripped motor blocks	52.00 to 53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 27.00 to $ 28.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	14.00 to 15.00
Machine shop turn.	1.00 to 2.00
Shoveling turnings	3.00 to 4.00
Cast iron borings	4.00 to 5.00
Low phos. 18 in. and under	52.00 to 53.00
Rails, random length	34.00 to 35.00
Rails, 2 ft. and under	59.00 to 60.00
No. 1 cupola cast	44.00 to 45.00
Heavy breakable cast	20.00 to 21.00
Drop broken cast	59.00 to 60.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 26.00 to $ 27.00
No. 2 hvy. melting	22.00 to 24.00
No. 2 dealer bundles	22.00 to 23.00
Mixed bor. and turn.	7.00 to 8.00
Machine shop turn.	4.00 to 5.00
Shoveling turnings	10.00 to 12.00
Clean cast. chem. borings	34.00 to 35.00
No. 1 machinery cast	89.00 to 90.00
Mixed yard cast	38.00 to 39.00
Heavy breakable cast	14.00 to 15.00
Stainless	
18-8 prepared solids	360.00 to 385.00
18-8 turnings	255.00 to 275.00
430 prepared solids	70.00 to 80.00
410 solids	60.00 to 70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to $ 30.00
No. 2 hvy. melting	20.00 to 22.00
No. 1 dealer bundles	28.00 to 30.00
No. 2 bundles	16.00 to 18.00
No. 1 busheling	28.00 to 30.00
Shredder scrap	38.00 to 40.00
Machine shop turn.	1.00 to 2.00
Shoveling turnings	1.00 to 2.00
No. 1 machinery cast	100.00 to 105.00
Mixed cupola cast	23.00 to 25.00
Heavy breakable cast	4.00 to 6.00

San Francisco

No. 1 hvy. melting	$ 39.00 to $ 41.00
No. 2 hvy. melting	31.00 to 33.00
No. 1 dealer bundles	26.00 to 28.00
No. 2 dealer bundles	11.00 to 13.00
Machine shop turn.	4.00 to 6.00
Cast iron borings	4.00 to 6.00
No. 1 cupola cast	83.00 to 85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to $ 40.00
No. 2 hvy. melting	27.00 to 29.00
No. 1 dealer bundles	25.00 to 27.00
No. 2 dealer bundles	8.00 to 10.00
Machine shop turn.	4.00 to 6.00
Shoveling turnings	8.00 to 10.00
Cast iron borings	4.00 to 6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to 86.00
No. 1 cupola cast	86.00 to 88.00

Seattle

No. 1 hvy. melting	$ 53.00 to $ 55.00
No. 2 hvy. melting	42.00 to 44.00
No. 2 bundles	32.00 to 34.00
No. 1 cupola cast	88.00 to 90.00
Mixed yard cast	78.00 to 80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 33.00
No. 2 heavy melting cut 2 ft. and under	30.00
No. 1 dealer bundles	40.00
No. 2 bundles	5.00
Mixed steel scrap	17.00
Bush. new fact. prep'd.	38.00
Bush. new fact. unprp'd.	30.00
Machine shop turn.	18.00
Short steel turn.	21.00
Mixed bor. and turn.	10.00
Cast scrap	30.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00 to $ 51.00
No. 2 hvy. melting	38.00 to 39.00
No. 2 bundles	28.00 to 30.00
Machine shop turn.	8.00 to 9.00
Crushed turnings	17.00 to 19.00
Shredder scrap	50.00 to 51.00
Cut structural plate 2 ft. and under	72.00 to 74.00
Unstripped motor blocks	55.00 to 57.00
Cupola cast	64.00 to 66.00

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	151	138	149	205
Buffalo	30	30	29	59
Pittsburgh	121	80	139	213
Youngstown	57	50	53	97
Cleveland	62	61	64	107
Detroit	102	114	105	145
Chicago	283	268	297	465
Cincinnati	52	54	57	79
St. Louis	55	32	56	77
Southern	68	62	59	205
Western	46	45	47	103
U.S. Production	1,027	934	1,055	1,755

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective December 13, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	1,027	934	69,622	114,531
Capability Utilization Rate	34.7	31.6	47.8	78.5

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 51.17	$ 51.17	$ 51.17	$ 75.50
No. 2 bundles	$ 38.50	$ 38.50	$ 38.50	$ 52.83

Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh ..	$ 52.50	$ 52.50	$ 52.50	$84.50
No. 1 steel, Philadelphia	54.50	54.50	54.50	66.50
No. 1 steel, Chicago.....	46.50	46.50	46.50	75.50
No. 1 bundles, Detroit...	41.50	41.50	41.50	73.50
Low Phos., Youngstown	51.50	51.50	52.50	85.50
No. 1 mach'y cast., Pgh	61.50	61.50	64.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	111.50
No. 1 mach'y cast., Chi.	103.50	103.50	103.50	117.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective December 13, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	70.00-73.00	71.00-73.00	12/10/82
Lead	19.50-23.00	20.50-23.00	12/10/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00-40.00	38.00-42.00	11/29/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas .$2.00
Beryllium-aluminum 5% Be, per lb. contained Be.....$201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200.....$166.00
Bismuth, ton lots .....$1.25-$1.40
Cadmium, under one ton .....$1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8%.....$3.75
Cobalt, 99%, cathode.....$12.50
Gold per troy oz. $438.75
Indium, dollars per troy oz.....$2.60-$2.85
Iridium, dollars per troy oz.....$600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$365-$385
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz.....$10.38
Vanadium $4.94
Zirconium sponge.....$12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Dec. 6—559.31 Dec. 9—559.97
Dec. 7—559.70 Dec. 10—559.97
Dec. 8—560.10

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	65½	56¼
Yellow brass	57⅞	52¾
Red brass	61¼	54¾
Comm. bronze	62¼	55¼
Mang. bronze	57¾	56
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	57
No. 2 copper wire	51
Light copper	42

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	47
Light copper	38
No. 1 composition	50
No. 1 comp. turnings	47
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	26
Radiators	42

Aluminum

New mixed clips	23	—24
Old sheet	22	—23
Old cast	22	—23
Clean dry borings	23	—24

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	22	—23
Mixed L.C. clips	20	—21
Old sheets and cast	14	—15
Borings and turnings	10	—11
Duraluminum clippings	20	—21

Copper and Brass

No. 1 copper wire	47	—48
No. 2 copper wire	40	—41
Light copper	35	—36
Radiators	33	—34
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	26	—27
Brass Pipe	28	—29
New soft brass clippings	34	—35

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	18	—19

Nickel

Nickel solids	110	—115
Nickel rod ends	110	—115
Nickel sheets, clips	110	—115
Nickel turnings	50	— 55

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

EFFECTIVE DECEMBER 13, 1982

MATERIALS NEWSFRONT

(Effective December 13, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 52.00 to $ 53.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 dealer bundles	65.00 to 66.00
No. 1 factory bundles (auto)	58.00 to 59.00
No. 2 bundles	37.00 to 38.00
No. 1 busheling	58.00 to 59.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	18.00 to 19.00
Low phos. punchings plate	67.00 to 68.00
Heavy turnings	45.00 to 46.00
No. 1 RR hvy. melting	64.00 to 65.00
Rails 2 ft. and under	76.00 to 77.00
Scrap rails, random lgth.	73.00 to 74.00
RR specialties	65.00 to 66.00
No. 1 machinery cast	61.00 to 62.00
Cupola cast	54.00 to 55.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	410.00 to 420.00
18-8 turnings	310.00 to 320.00

Chicago

No. 1 hvy. melting	$ 46.00 to $ 47.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	57.00 to 58.00
No. 1 factory bundles (auto)	60.00 to 61.00
No. 2 dealer bundles	38.00 to 39.00
No. 1 busheling	57.00 to 58.00
Shredder scrap	56.00 to 57.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	33.00 to 34.00
Low phos. forge crop	74.00 to 75.00
Low phos. punchings plate ¼ in. and heavier	79.00 to 80.00
Low phos. 2 ft. and under	73.00 to 74.00
No. 1 RR hvy. melting	48.00 to 49.00
Scrap rails, random lgth.	47.00 to 48.00
Reroller rails	85.00 to 86.00
Rails, 2 ft. and under	74.00 to 75.00
RR couplers and knuckles	69.00 to 70.00
RR car axles	99.00 to 100.00
No. 1 machinery cast	103.00 to 104.00
Cupola cast	89.00 to 90.00
Stove plate	76.00 to 77.00
Steel car wheels	57.00 to 58.00
Stainless	
18-8 bundles and solids	390.00 to 400.00
18-8 turnings	290.00 to 300.00
430 bundles and solids	90.00 to 95.00
430 turnings	65.00 to 70.00

Philadelphia

No. 1 hvy. melting	$ 53.00 to $ 56.00
No. 2 hvy. melting	48.00 to 51.00
No. 1 dealer bundles	67.00 to 70.00
No. 2 dealer bundles	38.00 to 41.00
No. 1 busheling	67.00 to 70.00
Shredder scrap	65.00 to 68.00
Machine shop turn.	18.00 to 21.00
Mixed bor. and turn.	18.00 to 21.00
Shoveling turnings	31.00 to 34.00
Clean cast chemical borings	40.00 to 43.00
Low phos. 5 ft. and under	60.00 to 63.00
Low phos. 2 ft. punchings	85.00 to 88.00
Electric furnace bundles	75.00 to 78.00
RR specialties	74.00 to 77.00
Rails, 2 ft. and under	89.00 to 92.00
Cupola cast	55.00 to 58.00
Heavy breakable cast	53.00 to 56.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 36.00 to $ 37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	40.00 to 41.00
Drop forge flashings	21.00 to 22.00
Machine shop turn.	14.00 to 15.00
Mixed borings and turn.	7.00 to 8.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	5.00 to 6.00
Heavy breakable cast	24.00 to 25.00
Mixed cupola cast	40.00 to 41.00
Automobile cast	58.00 to 59.00
Stainless	
18-8 bundles and solids	395.00 to 405.00
18-8 turnings	285.00 to 295.00
430 bundles and solids	70.00 to 80.00

Youngstown

No. 1 hvy. melting	$ 44.00 to $ 45.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	50.00 to 51.00
No. 2 dealer bundles	29.00 to 30.00
Machine shop turn.	2.00 to 3.00
Shoveling turnings	7.00 to 8.00
Low phos. plate	51.00 to 52.00
Electric furnace bundles	51.00 to 52.00
Galvanized bundles	41.00 to 42.00

Cleveland

No. 1 hvy. melting	$ 42.00 to $ 43.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	46.00 to 47.00
No. 1 factory bundles	51.00 to 52.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	47.00 to 48.00
Machine shop turn.	2.00 to 3.00
Mixed bor. and turn.	2.00 to 3.00
Shoveling turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Cut structural & plates, 2 ft. and under	68.00 to 69.00
Low phos. punchings plate	68.00 to 69.00
Drop forge flashings	33.00 to 34.00
Foundry steel, 2 ft. & under	59.00 to 60.00
No. 1 RR hvy melting	63.00 to 64.00
Rails, 2 ft. and under	82.00 to 83.00
Rails, 18 in. and under	83.00 to 84.00
Steel axle turnings	69.00 to 70.00
Railroad cast	82.00 to 83.00
No. 1 machinery cast	79.00 to 80.00
Cupola cast	62.00 to 63.00
Stove plate	47.00 to 48.00
Stainless	
18-8 bundles	300.00 to 310.00
18-8 turnings	250.00 to 260.00
430 bundles	75.00 to 85.00

Buffalo

No. 1 hvy. melting	$ 25.00 to $ 26.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 busheling	30.00 to 31.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	12.00 to 13.00
Machine shop turn.	1.00 to 2.00
Mixed bor. and turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	8.00 to 9.00
Low phos. plate	48.00 to 49.00
Structural and plate, 2 ft. and under	46.00 to 47.00
Rails, 2 ft. and under	42.00 to 43.00
Scrap rails, random lgth.	22.00 to 23.00
No. 1 machinery cast	63.00 to 64.00
No. 1 cupola cast	42.00 to 43.00

St. Louis

No. 1 hvy. melting	$ 47.00 to $ 48.00
No. 2 hvy. melting	39.00 to 40.00
Foundry steel, 2 ft.	39.00 to 40.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	36.00 to 37.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	30.00 to 31.00
No. 1 RR hvy. melting	47.00 to 48.00
Rails, random length	49.00 to 50.00
Rails, 18 in. and under	64.00 to 65.00
RR specialties	80.00 to 81.00
Cupola cast	70.00 to 71.00
Heavy breakable cast	48.00 to 49.00
Stove plate	70.00 to 71.00
Cast iron car wheels	49.00 to 50.00
Rerolling rails	84.00 to 85.00
Unstripped motor blocks	55.00 to 56.00

Birmingham

No. 1 heavy melting	$ 54.00 to $ 55.00
No. 2 heavy melting	52.00 to 53.00
No. 1 dealer bundles	54.00 to 55.00
No. 2 bundles	40.00 to 41.00
No. 1 busheling	54.00 to 55.00
Shredder scrap	71.00 to 72.00
Machine shop. turn.	18.00 to 19.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	26.00 to 27.00
Electric furnace bundles	51.00 to 52.00
Elec. furnace, 3 ft. & under	50.00 to 51.00
Structural and plate, 2 ft.	70.00 to 71.00
Structural and plate, 4 ft.	65.00 to 66.00
No. 1 RR hvy. melting	54.00 to 55.00
Scrap rails, random lgth.	57.00 to 58.00
Rails, 18 in. and under	74.00 to 75.00
Angles and splice bars	65.00 to 66.00
No. 1 cupola cast	74.00 to 75.00
Unstripped motor blocks	52.00 to 53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 27.00 to $ 28.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	14.00 to 15.00
Machine shop turn.	1.00 to 2.00
Shoveling turnings	3.00 to 4.00
Cast iron borings	4.00 to 5.00
Low phos. 18 in. and under	52.00 to 53.00
Rails, random length	34.00 to 35.00
Rails, 2 ft. and under	59.00 to 60.00
No. 1 cupola cast	44.00 to 45.00
Heavy breakable cast	20.00 to 21.00
Drop broken cast	59.00 to 60.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 26.00 to $ 27.00
No. 2 hvy. melting	22.00 to 24.00
No. 2 dealer bundles	22.00 to 23.00
Mixed bor. and turn.	7.00 to 8.00
Machine shop turn.	4.00 to 5.00
Shoveling turnings	10.00 to 12.00
Clean cast. chem. borings	34.00 to 35.00
No. 1 machinery cast	89.00 to 90.00
Mixed yard cast	38.00 to 39.00
Heavy breakable cast	14.00 to 15.00
Stainless	
18-8 prepared solids	385.00 to 390.00
18-8 turnings	280.00 to 280.00
430 prepared solids	70.00 to 80.00
410 solids	60.00 to 70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to $ 30.00
No. 2 hvy. melting	20.00 to 22.00
No. 1 dealer bundles	28.00 to 30.00
No. 2 bundles	16.00 to 18.00
No. 1 busheling	28.00 to 30.00
Shredder scrap	38.00 to 40.00
Machine shop turn.	1.00 to 2.00
Shoveling turnings	1.00 to 2.00
No. 1 machinery cast	100.00 to 105.00
Mixed cupola cast	23.00 to 25.00
Heavy breakable cast	4.00 to 6.00

San Francisco

No. 1 hvy. melting	$ 39.00 to $ 41.00
No. 2 hvy. melting	31.00 to 33.00
No. 1 dealer bundles	26.00 to 28.00
No. 2 dealer bundles	11.00 to 13.00
Machine shop turn.	4.00 to 6.00
Cast iron borings	4.00 to 6.00
No. 1 cupola cast	83.00 to 85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to $ 40.00
No. 2 hvy. melting	27.00 to 29.00
No. 1 dealer bundles	25.00 to 27.00
No. 2 dealer bundles	8.00 to 10.00
Machine shop turn.	4.00 to 6.00
Shoveling turnings	8.00 to 10.00
Cast iron borings	4.00 to 6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to 86.00
No. 1 cupola cast	86.00 to 88.00

Seattle

No. 1 hvy. melting	$ 53.00 to $ 55.00
No. 2 hvy. melting	42.00 to 44.00
No. 2 bundles	32.00 to 34.00
No. 1 cupola cast	88.00 to 90.00
Mixed yard cast	78.00 to 80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 33.00
No. 2 heavy melting cut 2 ft. and under	30.00
No. 1 dealer bundles	40.00
No. 2 bundles	5.00
Mixed steel scrap	17.00
Bush. new fact. prep'd.	38.00
Bush. new fact. unprp'd.	30.00
Machine shop turn.	18.00
Short steel turn.	21.00
Mixed bor. and turn.	10.00
Cast scrap	30.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00 to $ 51.00
No. 2 hvy. melting	38.00 to 39.00
No. 2 bundles	28.00 to 30.00
Machine shop turn.	8.00 to 9.00
Crushed turnings	17.00 to 19.00
Shredder scrap	50.00 to 51.00
Cut structural plate 2 ft. and under	72.00 to 74.00
Unstripped motor blocks	55.00 to 57.00
Cupola cast	84.00 to 86.00

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	138	141	160	197
Buffalo	30	30	31	58
Pittsburgh	80	62	137	285
Youngstown	50	43	56	119
Cleveland	61	67	65	103
Detroit	114	89	98	147
Chicago	268	290	322	465
Cincinnati	54	57	64	85
St. Louis	32	33	54	83
Southern	62	60	70	200
Western	45	43	49	111
U.S. Production	934	915	1,106	1,852

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer..... gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective December 6, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	934	915	68,595	112,702
Capability Utilization Rate	31.6	31.0	48.1	78.9

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 51.17	$ 51.17	$ 51.17	$ 75.50
No. 2 bundles	$ 38.50	$ 38.50	$ 38.83	$ 52.83
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh ..	$ 52.50	$ 52.50	$ 52.50	$84.50
No. 1 steel, Philadelphia	54.50	54.50	54.50	66.50
No. 1 steel, Chicago.....	46.50	46.50	46.50	75.50
No. 1 bundles, Detroit...	41.50	41.50	41.50	73.50
Low Phos., Youngstown	51.50	52.50	52.50	85.50
No. 1 mach'y cast., Pgh	61.50	61.50	64.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	111.50
No. 1 mach'y cast., Chi.	103.50	103.50	103.50	117.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective December 6, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	71.00	70.00-71.00	12/3/82
Lead	20.50-26.00	21.50-26.00	11/19/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00-40.00	38.00-42.00	11/29/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas .$2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 .....$166.00
Bismuth, ton lots .....$1.25-$1.40
Cadmium, under one ton .....$1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $445.25
Indium, dollars per troy oz. .....$2.60-$2.85
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$365-$385
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $10.26
Vanadium $4.94
Zirconium sponge .....$12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Nov. 29—559.97 Dec. 2—559.97
Nov. 30—559.83 Dec. 3—559.04
Dec. 1—559.97

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	65½	58¼
Yellow brass	57⅞	52¾
Red brass	61¼	54¾
Comm. bronze	62¼	55¼
Mang. bronze	57¾	56
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	57
No. 2 copper wire	51
Light copper	42

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	47
Light copper	38
No. 1 composition	50
No. 1 comp. turnings	47
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	26
Radiators	42

Aluminum

New mixed clips	23	—24
Old sheet	22	—23
Old cast	22	—23
Clean dry borings	23	—24

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	22	—23
Mixed L.C. clips	20	—21
Old sheets and cast	14	—15
Borings and turnings	10	—11
Duraluminum clippings	20	—21

Copper and Brass

No. 1 copper wire	47	—48
No. 2 copper wire	40	—41
Light copper	35	—36
Radiators	33	—34
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	26	—27
Brass Pipe	28	—29
New soft brass clippings	34	—35

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	18	—19

Nickel

Nickel solids	110	—115
Nickel rod ends	110	—115
Nickel sheets, clips	110	—115
Nickel turnings	50	— 55

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

EFFECTIVE DECEMBER 6, 1982

MATERIALS NEWSFRONT

(Effective December 6, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	45.00 to	46.00
No. 1 dealer bundles	65.00 to	66.00
No. 1 factory bundles (auto)	58.00 to	59.00
No. 2 bundles	37.00 to	38.00
No. 1 busheling	58.00 to	59.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	67.00 to	68.00
Heavy turnings	45.00 to	46.00
No. 1 RR hvy. melting	64.00 to	65.00
Rails 2 ft. and under	76.00 to	77.00
Scrap rails, random lgth.	73.00 to	74.00
RR specialties	65.00 to	66.00
No. 1 machinery cast	61.00 to	62.00
Cupola cast	54.00 to	55.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	410.00 to	420.00
18-8 turnings	310.00 to	320.00

Chicago

No. 1 hvy. melting	$ 46.00 to	$ 47.00
No. 2 hvy. melting	42.00 to	43.00
No. 1 dealer bundles	57.00 to	58.00
No. 1 factory bundles (auto)	60.00 to	61.00
No. 2 dealer bundles	38.00 to	39.00
No. 1 busheling	56.00 to	57.00
Shredder scrap	56.00 to	57.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	33.00 to	34.00
Low phos. forge crop	74.00 to	75.00
Low phos. punchings plate ¼ in. and heavier	78.00 to	79.00
Low phos. 2 ft. and under	73.00 to	74.00
No. 1 RR hvy. melting	48.00 to	49.00
Scrap rails, random lgth.	47.00 to	48.00
Reroller rails	85.00 to	86.00
Rails, 2 ft. and under	74.00 to	75.00
RR couplers and knuckles	69.00 to	70.00
RR car axles	99.00 to	100.00
No. 1 machinery cast	103.00 to	104.00
Cupola cast	89.00 to	90.00
Stove plate	76.00 to	77.00
Steel car wheels	57.00 to	58.00
Stainless		
18-8 bundles and solids	390.00 to	400.00
18-8 turnings	290.00 to	300.00
430 bundles and solids	90.00 to	95.00
430 turnings	65.00 to	70.00

Philadelphia

No. 1 hvy. melting	$ 53.00 to	$ 56.00
No. 2 hvy. melting	48.00 to	51.00
No. 1 dealer bundles	65.00 to	68.00
No. 2 dealer bundles	38.00 to	41.00
No. 1 busheling	65.00 to	68.00
Shredder scrap	65.00 to	68.00
Machine shop turn.	18.00 to	21.00
Mixed bor. and turn.	18.00 to	21.00
Shoveling turnings	30.00 to	33.00
Clean cast chemical borings	40.00 to	43.00
Low phos. 5 ft. and under	60.00 to	63.00
Low phos. 2 ft. punchings	85.00 to	88.00
Electric furnace bundles	75.00 to	78.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	89.00 to	92.00
Cupola cast	55.00 to	58.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 36.00 to	$ 37.00
No. 2 hvy. melting	34.00 to	35.00
No. 1 dealer bundles	41.00 to	42.00
No. 2 bundles	18.00 to	19.00
No. 1 busheling	40.00 to	41.00
Drop forge flashings	21.00 to	22.00
Machine shop turn.	14.00 to	15.00
Mixed borings and turn.	7.00 to	8.00
Shoveling turnings	14.00 to	15.00
Cast iron borings	5.00 to	6.00
Heavy breakable cast	24.00 to	25.00
Mixed cupola cast	40.00 to	41.00
Automobile cast	58.00 to	59.00
Stainless		
18-8 bundles and solids	395.00 to	405.00
18-8 turnings	285.00 to	295.00
430 bundles and solids	70.00 to	80.00

Youngstown

No. 1 hvy. melting	$ 44.00 to	$ 45.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	50.00 to	51.00
No. 2 dealer bundles	29.00 to	30.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	51.00 to	52.00
Electric furnace bundles	51.00 to	52.00
Galvanized bundles	41.00 to	42.00

Cleveland

No. 1 hvy. melting	$ 42.00 to	$ 43.00
No. 2 hvy. melting	24.00 to	25.00
No. 1 dealer bundles	46.00 to	47.00
No. 1 factory bundles	51.00 to	52.00
No. 2 bundles	22.00 to	23.00
No. 1 busheling	47.00 to	48.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	68.00 to	69.00
Low phos. punchings plate	68.00 to	69.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	82.00 to	83.00
Rails, 18 in. and under	83.00 to	84.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	79.00 to	80.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	300.00 to	310.00
18-8 turnings	250.00 to	260.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 25.00 to	$ 26.00
No. 2 hvy. melting	15.00 to	16.00
No. 1 busheling	30.00 to	31.00
No. 1 dealer bundles	28.00 to	29.00
No. 2 bundles	12.00 to	13.00
Machine shop turn.	1.00 to	2.00
Mixed bor. and turn.	8.00 to	9.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Low phos. plate	48.00 to	49.00
Structural and plate, 2 ft. and under	46.00 to	47.00
Rails, 2 ft. and under	42.00 to	43.00
Scrap rails, random lgth.	22.00 to	23.00
No. 1 machinery cast	63.00 to	64.00
No. 1 cupola cast	42.00 to	43.00

St. Louis

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	39.00 to	40.00
Foundry steel, 2 ft.	39.00 to	40.00
No. 1 dealer bundles	47.00 to	48.00
No. 2 bundles	36.00 to	37.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	47.00 to	48.00
Rails, random length	49.00 to	50.00
Rails, 18 in. and under	64.00 to	65.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 54.00 to	$ 55.00
No. 2 heavy melting	52.00 to	53.00
No. 1 dealer bundles	54.00 to	55.00
No. 2 bundles	43.00 to	44.00
No. 1 busheling	54.00 to	55.00
Shredder scrap	72.00 to	73.00
Machine shop. turn.	18.00 to	19.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	51.00 to	52.00
Elec. furnace, 3 ft. & under	52.00 to	53.00
Structural and plate, 2 ft.	70.00 to	71.00
Structural and plate, 4 ft.	65.00 to	66.00
No. 1 RR hvy. melting	54.00 to	55.00
Scrap rails, random lgth.	57.00 to	58.00
Rails, 18 in. and under	74.00 to	75.00
Angles and splice bars	65.00 to	66.00
No. 1 cupola cast	74.00 to	75.00
Unstripped motor blocks	52.00 to	53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 27.00 to	$ 28.00
No. 2 hvy. melting	26.00 to	27.00
No. 1 dealer bundles	28.00 to	29.00
No. 2 bundles	14.00 to	15.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	3.00 to	4.00
Cast iron borings	4.00 to	5.00
Low phos. 18 in. and under	52.00 to	53.00
Rails, random length	34.00 to	35.00
Rails, 2 ft. and under	59.00 to	60.00
No. 1 cupola cast	44.00 to	45.00
Heavy breakable cast	20.00 to	21.00
Drop broken cast	59.00 to	60.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 26.00 to	$ 27.00
No. 2 hvy. melting	22.00 to	24.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	375.00 to	400.00
18-8 turnings	290.00 to	325.00
430 prepared solids	80.00 to	90.00
410 solids	70.00 to	80.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to	$ 30.00
No. 2 hvy. melting	20.00 to	22.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 bundles	16.00 to	18.00
No. 1 busheling	28.00 to	30.00
Shredder scrap	38.00 to	40.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	1.00 to	2.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	23.00 to	25.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	27.00 to	29.00
No. 1 dealer bundles	25.00 to	27.00
No. 2 dealer bundles	8.00 to	10.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 53.00 to	$ 55.00
No. 2 hvy. melting	42.00 to	44.00
No. 2 bundles	32.00 to	34.00
No. 1 cupola cast	88.00 to	90.00
Mixed yard cast	78.00 to	80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 33.00
No. 2 heavy melting cut 2 ft. and under	30.00
No. 1 dealer bundles	40.00
No. 2 bundles	5.00
Mixed steel scrap	17.00
Bush. new fact. prep'd.	38.00
Bush. new fact. unprp'd.	30.00
Machine shop turn.	18.00
Short steel turn.	21.00
Mixed bor. and turn.	10.00
Cast scrap	30.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	38.00 to	39.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	8.00 to	9.00
Crushed turnings	17.00 to	19.00
Shredder scrap	50.00 to	51.00
Cut structural plate 2 ft. and under	72.00 to	74.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	66.00

EFFECTIVE NOVEMBER 29, 1982

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	141	149	156	212
Buffalo	30	29	30	60
Pittsburgh	62	139	126	309
Youngstown	43	53	68	138
Cleveland	67	64	81	109
Detroit	89	105	92	119
Chicago	290	297	326	490
Cincinnati	57	57	63	96
St. Louis	33	56	52	85
Southern	60	59	69	208
Western	43	47	48	123
U.S. Production	915	1,055	1,111	1,949

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective November 29, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	915	1,055	67,661	110,891
Capability Utilization Rate	31.0	35.7	48.5	79.2

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.197	25.297	25.297	25.195
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$203.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 51.17	$ 51.17	$ 51.17	$ 75.50
No. 2 bundles	$ 38.50	$ 38.50	$ 38.83	$ 53.83

Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh ..	$ 52.50	$ 52.50	$ 52.50	$84.50
No. 1 steel, Philadelphia	54.50	54.50	54.50	66.50
No. 1 steel, Chicago.....	46.50	46.50	46.50	75.50
No. 1 bundles, Detroit...	41.50	41.50	41.50	73.50
Low Phos., Youngstown	52.50	52.50	52.50	85.50
No. 1 mach'y cast., Pgh	61.50	64.50	64.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	111.50
No. 1 mach'y cast., Chi.	103.50	103.50	103.50	117.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective November 29, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	68.00	68.00-70.00	11/12/82
Lead	20.50-26.00	21.50-26.00	11/19/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00-42.00	40.00-42.00	11/9/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.35-$1.45
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $434.00
Indium, dollars per troy oz. ..... $2.85-$4.00
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$365-$385
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $9.64
Vanadium $4.94
Zirconium sponge ..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Nov. 22—558.12
Nov. 23—558.91
Nov. 24—559.70
Nov. 25—Holiday
Nov. 26—559.44

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	65½	56¼
Yellow brass	57⅞	52¾
Red brass	61¼	54¾
Comm. bronze	62¼	55¼
Mang. bronze	57¾	56
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	49
Light copper	39

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	51
No. 2 copper wire	45
Light copper	35
No. 1 composition	50
No. 1 comp. turnings	47
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	26
Radiators	41

Aluminum

New mixed clips	24	—25
Old sheet	23	—24
Old cast	23	—24
Clean dry borings	23	—24

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	22	—23
Mixed L.C. clips	20	—21
Old sheets and cast	14	—15
Borings and turnings	10	—11
Duraluminum clippings	20	—21

Copper and Brass

No. 1 copper wire	46	—47
No. 2 copper wire	39	—40
Light copper	34	—35
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	26	—27
Brass Pipe	28	—29
New soft brass clippings	34	—35

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	18	—19

Nickel

Nickel solids	110	—115
Nickel rod ends	110	—115
Nickel sheets, clips	110	—115
Nickel turnings	50	— 55

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

MATERIALS NEWSFRONT

(Effective November 29, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 52.00 to $ 53.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 dealer bundles	65.00 to 66.00
No. 1 factory bundles (auto)	58.00 to 59.00
No. 2 bundles	37.00 to 38.00
No. 1 busheling	58.00 to 59.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	18.00 to 19.00
Low phos. punchings plate	67.00 to 68.00
Heavy turnings	45.00 to 46.00
No. 1 RR hvy. melting	64.00 to 65.00
Rails 2 ft. and under	76.00 to 77.00
Scrap rails, random lgth.	73.00 to 74.00
RR specialties	65.00 to 66.00
No. 1 machinery cast	61.00 to 62.00
Cupola cast	54.00 to 55.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	420.00 to 425.00
18-8 turnings	320.00 to 325.00

Chicago

No. 1 hvy. melting	$ 46.00 to $ 47.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	56.00 to 57.00
No. 1 factory bundles (auto)	60.00 to 61.00
No. 2 dealer bundles	38.00 to 39.00
No. 1 busheling	56.00 to 57.00
Shredder scrap	56.00 to 57.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	32.00 to 33.00
Low phos. forge crop	74.00 to 75.00
Low phos. punchings plate ¼ in. and heavier	78.00 to 79.00
Low phos. 2 ft. and under	73.00 to 74.00
No. 1 RR hvy. melting	48.00 to 49.00
Scrap rails, random lgth.	47.00 to 48.00
Reroller rails	85.00 to 86.00
Rails, 2 ft. and under	74.00 to 75.00
RR couplers and knuckles	69.00 to 70.00
RR car axles	102.00 to 103.00
No. 1 machinery cast	103.00 to 104.00
Cupola cast	89.00 to 90.00
Stove plate	76.00 to 77.00
Steel car wheels	57.00 to 58.00
Stainless	
18-8 bundles and solids	390.00 to 400.00
18-8 turnings	290.00 to 300.00
430 bundles and solids	90.00 to 95.00
430 turnings	65.00 to 70.00

Philadelphia

No. 1 hvy. melting	$ 53.00 to $ 56.00
No. 2 hvy. melting	48.00 to 51.00
No. 1 dealer bundles	65.00 to 68.00
No. 2 dealer bundles	38.00 to 41.00
No. 1 busheling	65.00 to 68.00
Shredder scrap	71.00 to 74.00
Machine shop turn.	18.00 to 21.00
Mixed bor. and turn.	18.00 to 21.00
Shoveling turnings	30.00 to 33.00
Clean cast chemical borings	40.00 to 43.00
Low phos. 5 ft. and under	60.00 to 63.00
Low phos. 2 ft. punchings	85.00 to 88.00
Electric furnace bundles	75.00 to 79.00
RR specialties	74.00 to 77.00
Rails, 2 ft. and under	89.00 to 92.00
Cupola cast	55.00 to 58.00
Heavy breakable cast	53.00 to 56.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 36.00 to $ 37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	40.00 to 41.00
Drop forge flashings	21.00 to 22.00
Machine shop turn.	14.00 to 15.00
Mixed borings and turn.	7.00 to 8.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	5.00 to 6.00
Heavy breakable cast	24.00 to 25.00
Mixed cupola cast	40.00 to 41.00
Automobile cast	58.00 to 59.00
Stainless	
18-8 bundles and solids	395.00 to 405.00
18-8 turnings	285.00 to 295.00
430 bundles and solids	70.00 to 80.00

Youngstown

No. 1 hvy. melting	$ 45.00 to $ 46.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	51.00 to 52.00
No. 2 dealer bundles	30.00 to 31.00
Machine shop turn.	2.00 to 3.00
Shoveling turnings	8.00 to 9.00
Low phos. plate	52.00 to 53.00
Electric furnace bundles	52.00 to 53.00
Galvanized bundles	42.00 to 43.00

Cleveland

No. 1 hvy. melting	$ 42.00 to $ 43.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	46.00 to 47.00
No. 1 factory bundles	51.00 to 52.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	47.00 to 48.00
Machine shop turn.	2.00 to 3.00
Mixed bor. and turn.	2.00 to 3.00
Shoveling turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Cut structural & plates, 2 ft. and under	68.00 to 69.00
Low phos. punchings plate	68.00 to 69.00
Drop forge flashings	33.00 to 34.00
Foundry steel, 2 ft. & under	59.00 to 60.00
No. 1 RR hvy melting	63.00 to 64.00
Rails, 2 ft. and under	82.00 to 83.00
Rails, 18 in. and under	83.00 to 84.00
Steel axle turnings	69.00 to 70.00
Railroad cast	82.00 to 83.00
No. 1 machinery cast	79.00 to 80.00
Cupola cast	62.00 to 63.00
Stove plate	47.00 to 48.00
Stainless	
18-8 bundles	375.00 to 385.00
18-8 turnings	295.00 to 305.00
430 bundles	75.00 to 85.00

Buffalo

No. 1 hvy. melting	$ 25.00 to $ 26.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 busheling	30.00 to 31.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	12.00 to 13.00
Machine shop turn.	1.00 to 2.00
Mixed bor. and turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	8.00 to 9.00
Low phos. plate	48.00 to 49.00
Structural and plate, 2 ft. and under	46.00 to 47.00
Rails, 2 ft. and under	42.00 to 43.00
Scrap rails, random lgth.	22.00 to 23.00
No. 1 machinery cast	63.00 to 64.00
No. 1 cupola cast	42.00 to 43.00

St. Louis

No. 1 hvy. melting	$ 47.00 to $ 48.00
No. 2 hvy. melting	39.00 to 40.00
Foundry steel, 2 ft.	39.00 to 40.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	36.00 to 37.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	30.00 to 31.00
No. 1 RR hvy. melting	47.00 to 48.00
Rails, random length	49.00 to 50.00
Rails, 18 in. and under	64.00 to 65.00
RR specialties	80.00 to 81.00
Cupola cast	70.00 to 71.00
Heavy breakable cast	48.00 to 49.00
Stove plate	70.00 to 71.00
Cast iron car wheels	49.00 to 50.00
Rerolling rails	84.00 to 85.00
Unstripped motor blocks	55.00 to 56.00

Birmingham

No. 1 heavy melting	$ 54.00 to $ 55.00
No. 2 heavy melting	52.00 to 53.00
No. 1 dealer bundles	54.00 to 55.00
No. 2 bundles	43.00 to 44.00
No. 1 busheling	54.00 to 55.00
Shredder scrap	72.00 to 73.00
Machine shop. turn.	18.00 to 19.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	26.00 to 27.00
Electric furnace bundles	51.00 to 52.00
Elec. furnace, 3 ft. & under	52.00 to 53.00
Structural and plate, 2 ft.	70.00 to 71.00
Structural and plate, 4 ft.	65.00 to 66.00
No. 1 RR hvy. melting	54.00 to 55.00
Scrap rails, random lgth.	57.00 to 58.00
Rails, 18 in. and under	74.00 to 75.00
Angles and splice bars	65.00 to 66.00
No. 1 cupola cast	74.00 to 75.00
Unstripped motor blocks	52.00 to 53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 27.00 to $ 28.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	14.00 to 15.00
Machine shop turn.	1.00 to 2.00
Shoveling turnings	3.00 to 4.00
Cast iron borings	4.00 to 5.00
Low phos. 18 in. and under	52.00 to 53.00
Rails, random length	34.00 to 35.00
Rails, 2 ft. and under	59.00 to 60.00
No. 1 cupola cast	44.00 to 45.00
Heavy breakable cast	20.00 to 21.00
Drop broken cast	59.00 to 60.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 26.00 to $ 27.00
No. 2 hvy. melting	22.00 to 24.00
No. 2 dealer bundles	22.00 to 23.00
Mixed bor. and turn.	7.00 to 8.00
Machine shop turn.	4.00 to 5.00
Shoveling turnings	10.00 to 12.00
Clean cast. chem. borings	34.00 to 35.00
No. 1 machinery cast	89.00 to 90.00
Mixed yard cast	38.00 to 39.00
Heavy breakable cast	14.00 to 15.00
Stainless	
18-8 prepared solids	400.00 to 425.00
18-8 turnings	350.00 to 375.00
430 prepared solids	90.00 to 100.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to $ 30.00
No. 2 hvy. melting	20.00 to 22.00
No. 1 dealer bundles	28.00 to 30.00
No. 2 bundles	16.00 to 18.00
No. 1 busheling	28.00 to 30.00
Shredder scrap	36.00 to 40.00
Machine shop turn.	1.00 to 2.00
Shoveling turnings	1.00 to 2.00
No. 1 machinery cast	100.00 to 105.00
Mixed cupola cast	23.00 to 25.00
Heavy breakable cast	4.00 to 6.00

San Francisco

No. 1 hvy. melting	$ 39.00 to $ 41.00
No. 2 hvy. melting	31.00 to 33.00
No. 1 dealer bundles	26.00 to 28.00
No. 2 dealer bundles	11.00 to 13.00
Machine shop turn.	4.00 to 6.00
Cast iron borings	4.00 to 6.00
No. 1 cupola cast	83.00 to 85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to $ 40.00
No. 2 hvy. melting	27.00 to 29.00
No. 1 dealer bundles	25.00 to 27.00
No. 2 dealer bundles	8.00 to 10.00
Machine shop turn.	4.00 to 6.00
Shoveling turnings	8.00 to 10.00
Cast iron borings	4.00 to 6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to 86.00
No. 1 cupola cast	86.00 to 88.00

Seattle

No. 1 hvy. melting	$ 53.00 to $ 55.00
No. 2 hvy. melting	42.00 to 44.00
No. 2 bundles	32.00 to 34.00
No. 1 cupola cast	88.00 to 90.00
Mixed yard cast	78.00 to 80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 33.00
No. 2 heavy melting cut 2 ft. and under	30.00
No. 1 dealer bundles	40.00
No. 2 bundles	5.00
Mixed steel scrap	17.00
Bush. new fact. prep'd.	38.00
Bush. new fact. unprp'd.	30.00
Machine shop turn.	16.00
Short steel turn.	21.00
Mixed bor. and turn.	10.00
Cast scrap	30.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00 to $ 51.00
No. 2 hvy. melting	38.00 to 39.00
No. 2 bundles	28.00 to 30.00
Machine shop turn.	8.00 to 9.00
Crushed turnings	22.00 to 24.00
Shredder scrap	50.00 to 51.00
Cut structural plate 2 ft. and under	72.00 to 74.00
Unstripped motor blocks	55.00 to 57.00
Cupola cast	64.00 to 66.00

STEEL PRICES

Codes identify Producers listed in the Key on page 97. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A.—Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10	$420.00
R3	$420.00
Midwest	
R3, U1, W5	$420.00
S1	$420.00
C10	$420.00
K2	$400.00
W5	$400.00
West	
B3(2)	$430.00
C6	$420.00
South	
A7	$420.00
Alloy, East	
R3, C10	$459.00
B3	$459.00
Midwest	
W8, W5, C10	$459.00
S1, U1	$459.00
R3	$459.00
We	
B3	$469.00
C6	$469.00
South	
A7	$436.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7	24.15
C20	22.90
W8	22.90
I3, T10, U1, N4	23.90
West	
C6	25.10
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	23.90
W8	24.15
U1	23.90
I3	23.90
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	23.90
I3	23.90
West	
U1	24.40
C6	24.15
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut ll Edge—all widths, East	
B3, U1	20.80
J3	20.80
Midwest	
A7, D1	20.80
I4	20.20
S1, J3, D1	20.80
W3	20.80
N4	22.55
W5	20.80
U1	20.80
B3, G2, I3, M2, R3, J3, G3	20.80
West	
K1	20.80
B3	24.70
South	
R3	20.80
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
R7, S10, B4	29.60
P15	24.80
S7	Cmp*
U1	33.25
D1(1)	Cmp*
B4	31.55
Midwest	
G4	24.80
I4	30.15
W14	22.95
S1, U1, J3	32.00
T4	Cmp*

*Composite pricing

West	
U1	33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, East (plus extras)*	
Midwest	
M2, G3, R3, W3, I4, J3, G2, I3	20.80
A7	20.80
S1	20.80
West	
K1	20.80
South	
R3	20.80
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	23.20
G4	25.80
I4	22.70
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	42.60
P15	32.10
S1	39.90
Midwest	
I4	39.40
S1	37.65

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	20.80
J3	20.80
U1	20.80
Midwest	
A7, U1, B3, G2, G3, I3, M2, R3, W3	20.80
S1, W5, D1	20.80
J3	20.80
I4	19.90*
West	
U1	21.30
K1	20.80
South	
R3	20.80
Cold-Rolled, East, Class I	
B3(2), U1	24.65
J3	24.65
Midwest	
B3, I3, G3, R3, M2, U1(2)	24.65
G2, W3, M11	24.65
I4	22.00
J3, A7	24.65
S1, W5, D1	24.65
West	
U1	25.15
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	26.25
Midwest	
J3, D1	26.25
I3, W5, S1	26.25
U1, A7, R3, Y1	26.25
G2, W3, M11	26.25
West	
K1	27.15
South	
U1	26.25
R3	26.25
Enameling, Midwest	
A7, I3, U1, J3	26.15
S1	26.50
Long-Terne, Midwest	
W5	28.30
A7, U1	27.60
R3	27.60

*Actual weight basis

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
B3	23.25
South	
G7	22.35

Tinplate

Electrolytic Tinplate

	per base box
Single Reduced (70 lb)	
East	
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3 (75 lb)	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$25.44
U1	26.79
South	
U1	$26.29
Double Reduced (55 lb)	
Midwest	
M11 (50 lb)	$21.49
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$20.39
U1	21.99
South	
U1	$21.49
Black Plate	
Single Reduced (75 lb)	
East	
B3	$23.36
Midwest	
J3	$23.36
M11	24.01
I3, U1, W5	23.36
W3	24.01
West	
K1	$24.01
U1	23.36
Double Reduced (55 lb)	
East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

**70 lb—base weight extra 45¢
***50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3	23.95
R5	23.95
B3(3), J3	23.95
U1, C10	23.95
Midwest	
A7, C20, N4	23.95
U1, I3, I4	23.95
R3, T10	23.95
K2	23.95
I3	19.50*
West	
B3	23.95
C6	24.45
U1	23.95
B3	24.70
South	
A8	20.65
A7	23.95
C16	23.95
Cold-Finished Carbon, East	
A11	22.15
J3(2)	31.50
R3	31.50
C21	21.15
J3, L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	31.00
M1	23.025
B4, C10	31.00
J3	31.50
Midwest	
B5, W10, Y1, W8, R3	31.00
J3	32.15
B1	19.80
L2	30.75
N9	31.00
P3	19.85+CMS
W14	22.20
J3(3)	31.00
B5	31.25
J3	32.15
West	
B5	31.20
B5	34.90
R3	31.20-34.90
South	
B5	32.85
J3	31.95
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10	26.10
R3	26.10
J3	26.10
Midwest	
A7, U1, R3	26.10
I3, C10	26.10
I4	24.85
I3	21.00*
West	
B3, U1	26.10
B5	18.50
C6	26.60
B3	27.10
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	35.40
M1	28.025
R4	25.65
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	35.40
Midwest	
B5, R3, C10	34.85
C2	28.275
J3, M9, W10	35.40
P3	22.75
B1	22.70
N9	34.85
L2	34.65
B5	35.10
J3	36.00
J3	34.85
West	
R3	35.20-38.25
B5	35.20
B5	38.25
South	
J3	35.40
C16	28.00
B5	36.75

Plates

Carbon Steel, East	
B3(2)	24.25
L4	24.25
P2	24.25
U1	24.25
J3	25.25
Midwest	
B3, G3, R3, G2, S1	24.25
I3	24.25
J3, A7	21.70
U1, I4	24.25
West	
A7, B3, C6, O2	24.25
K1	23.50
U1	24.25
South	
R3	24.25
A7	25.25
U1	24.25
Alloy, East	
B3, J3	32.05
U1, L4	32.05
P2	32.05
Midwest	
B3	32.05
G2, G3	32.05
I4, U1	33.05
West	
B5	32.05
O2	30.55
K1	31.30
South	
A7	27.55

Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
U1	27.70
A7, R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
A7	25.95
C6	24.95

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilber B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guteri Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Corp., Detroit
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N8 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities* / City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	25.04	29.02	33.66	34.17	29.52	31.46	20.27	39.93	42.10	52.60	69.58	73.19
Baltimore	32.25	36.51	42.48	42.85	35.56	37.48	22.17	47.70	55.85	59.91	67.79	76.32
Birmingham	25.90	30.24	36.47	35.03	29.67	31.68	21.36	42.09	49.31	50.41	68.16	74.43
Boston	23.43	28.25	31.93	44.27	37.43	37.68	21.80	47.75	57.60	60.66	68.49	75.74
Buffalo	27.75	34.41	36.35	43.01	35.20	32.46	18.26	45.85	54.11	55.64	62.09	70.72
Chicago	20.66	27.56	29.92	28.38	27.89	27.59	15.85	37.90	36.36	45.80	52.34	58.53
Cincinnati	21.18	28.39	33.39	33.39	28.93	32.06	17.72	37.94	36.07	45.12	51.63	55.79
Cleveland	28.24	31.54	33.44	31.13	28.63	31.81	17.45	42.44	39.27	49.22	55.16	61.24
Denver	32.69	38.65	38.66	42.32	36.91	38.18	22.79	49.35	56.13	65.40	72.50	81.22
Detroit	22.66	31.48	32.73	33.22	28.59	23.84	17.16	38.14	36.36	42.15	50.79	56.90
Houston	23.83	28.28	32.53	41.35	34.12	37.90	17.16	38.14	36.36	42.15	50.79	56.90
Kansas City	23.37	27.16	31.59	30.36	30.20	35.62	17.37	43.29	41.88	50.92	56.17	63.93
Los Angeles	30.02	38.03	39.14	45.66	37.13	38.95	33.49	50.38	62.24	72.33	77.74	89.22
Memphis	31.11	31.16	35.27	37.84	31.07	33.84	32.34	39.82	52.82	56.96	67.85	77.44
Milwaukee	21.60	28.47	30.74	30.92	30.45	30.42	16.02	38.52	36.88	47.20	52.71	59.02
New York	22.00	26.53	30.70	42.40	31.67	32.93	20.83	48.87	50.98	59.83	68.45	75.35
Philadelphia	28.57	34.80	37.22	44.85	33.40	37.64	22.07	47.16	51.67	58.71	67.13	74.37
Pittsburgh	23.85	28.39	32.99	40.86	36.80	22.09	21.35	43.55	48.95	59.88	66.19	72.84
Portland	32.04	37.16	41.51	33.10	34.82	38.20	53.64	56.85	61.00	64.10	66.10	....
San Francisco	29.27	35.77	39.71	45.05	38.70	39.18	31.92	51.14	62.56	71.65	77.93	86.10
Seattle	29.85	35.14	37.68	48.76	32.89	35.32	29.86	51.38	64.02	70.14	73.83	87.67
Spokane	21.08	30.56	33.56	36.69	35.18	25.16	20.32	41.00	42.02	46.30	....	58.32
St. Louis	24.60	29.12	32.77	36.50	28.14	32.45	18.68	42.59	43.13	51.08	58.11	63.64
St. Paul	23.43	27.76	32.10	35.20	29.31	32.38	16.87	43.07	39.20	48.63	51.53	60.75

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ¾-$2^{15}/_{16}$; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1⅝" round; Cold drawn—1" round; Hot-rolled 4140—1⅝" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

METALWORKING PRICE TRENDS

Disinflation seems to be settling down for a long stay

During a warm November, prices of metalworking products were cool. The reason: Market demand for the products was not too hot.

That about tells it all for prices these days. The recession rolls on and prices cool down.

Lately, some of the metalworking products listed on the table here have been showing no month-to-month price changes at all—or even declines.

In November, for example, prices of eight of the 22 listed products were unchanged from October; four product lines showed actual price slides.

The latest price rise for the listed products came to 0.6 pct in November. That comes out to a bit more than 6 pct on an annual basis.

A better price trend perspective is seen in November prices compared to a year ago. In the case of all producer finished goods, the U.S. Labor Dept. noted that the year-to-year price advance came to 3.7 pct. For capital equipment, the price rise was 4 pct. The overall metalworking product price advance was close to that for capital equipment.

Most of the push in November producer goods prices came from hikes for natural gas, home heating oil and gasoline. But price analysts view these rises as temporary surges. In fact, since the November price report was issued, prices for these energy goods have given ground.

The strongest November price advance for the products listed on the table here was seen for electric motors. But even for this product line, the advance was nothing like the hikes of 1.7 pct and 1.5 pct made in earlier months of the year.

The disinflating economy is creating real problems for many companies. Where many companies used to hike price tags to keep profits up, many are now just trying to hold firm on their prices in hopes of preventing, or minimizing, losses.

Relief for these companies may be a long way off. Just about all economists see a modest recovery for next year and a continuation of recent productivity gains. These things add up to decreased inflationary expectations for 1983.

On top of these signs pointing to continued disinflation, is the special market weakness in capital goods. This, too, points to continued price softness for many metalworking product lines.

Latest Month Covered: November, 1982

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	373.1	0	+ 4.7
Metal Forming Machine Tools	411.5	+ 0.2	+ 6.1
Agricultural Machinery & Equip.	318.1	+ 0.3	+ 5.8
Construction Machinery & Equip.	347.8	+ 0.3	+ 5.5
Industrial Process Furnace & Ovens	356.1	0	+ 5.0
Industrial Material Handling Equip.	286.3	+ 0.2	+ 0.7
Pumps, Compressors & Allied Equip.	348.0	+ 0.1	+ 3.6
Fluid Power Equip. (Dec. 1970 = 100)	247.2	0	+ 8.3
Mechanical Power Transmission Equip.	311.4	+ 0.1	+ 2.4
Automobiles	218.4	− 0.5	+ 2.0
Motor Trucks—Light	274.0	0	+ 1.6
Motor Trucks—Heavy	317.4	0	+ 7.6
Railroad Equipment	357.5	0	+ 4.7
Fabricated Metal Structural Products	302.8	− 0.3	− 0.1
Electric Motors	293.1	+ 0.7	+ 1.2
Valves & Fittings	322.7	+ 0.1	+ 1.7
Ball & Roller Bearings	335.3	0	+ 4.3
Cutting Tools & Accessories	271.9	0	+ 3.8
Heating Equipment	238.9	+ 0.1	+ 4.4
Plumbing Fixtures & Brass Fittings	278.2	+ 0.1	+ 1.9
Metal Containers	327.0	− 0.5	+ 2.8
Miscellaneous Metal Products	288.5	− 0.4	+ 3.8

Data based on U.S. Labor Dept.'s Producer Price Index

Chilton's

JANUARY 12, 1983

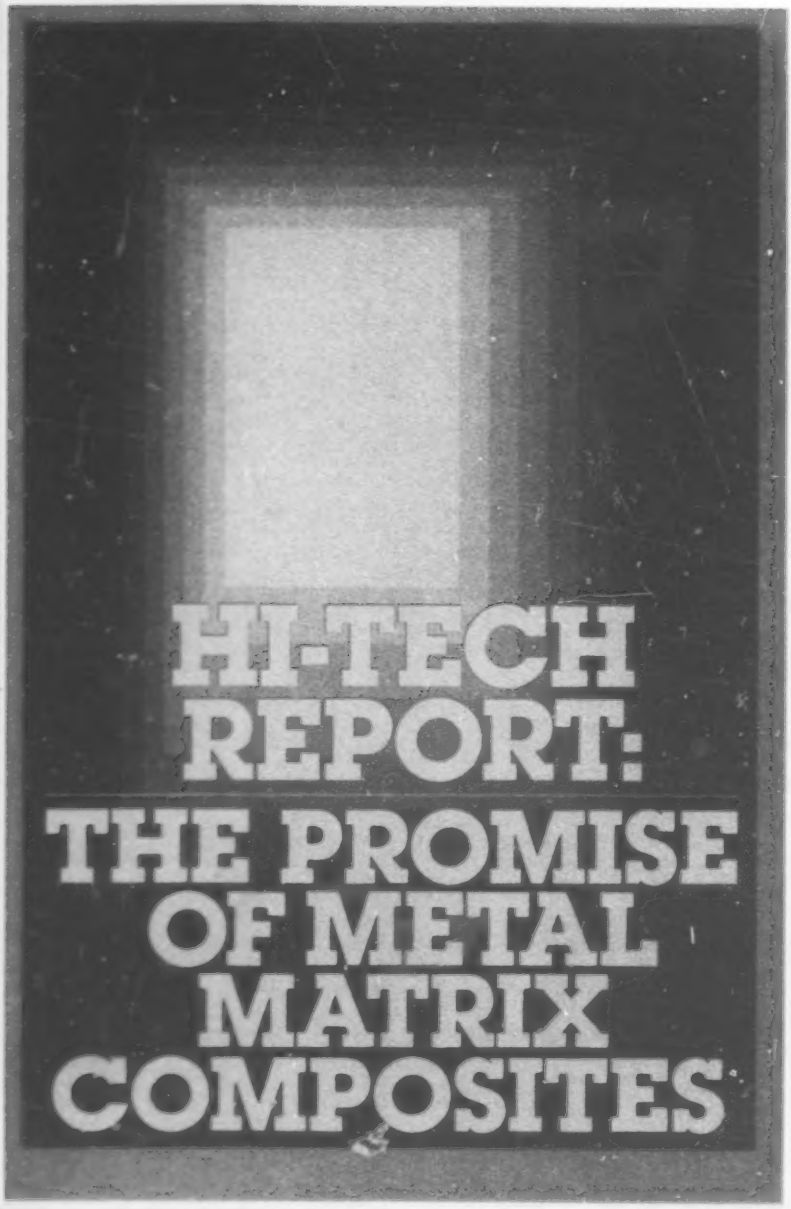
IRON AGE

THE MAGAZINE FOR METALWORKING MANAGEMENT

CYRUS TANG: MCLOUTH'S KNIGHT IN SHINING ARMOR

WHAT'S ON TAP FOR BUSINESS IN CONGRESS THIS YEAR

KEEPING YOUR PENSION SAFE AND SOUND



HI-TECH REPORT: THE PROMISE OF METAL MATRIX COMPOSITES

VOL. 226, NO. 2

IRON AGE

JANUARY 12, 1983

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ALUMINUM WRESTLES WITH ITS INVENTORY

Production hit bottom in November and is likely to remain there until the inventory situation improves and business picks up.

BY ROBERT REGAN

The aluminum industry awoke in the new year suffering through a traditional hangover without having had the privilege of a binge the year before.

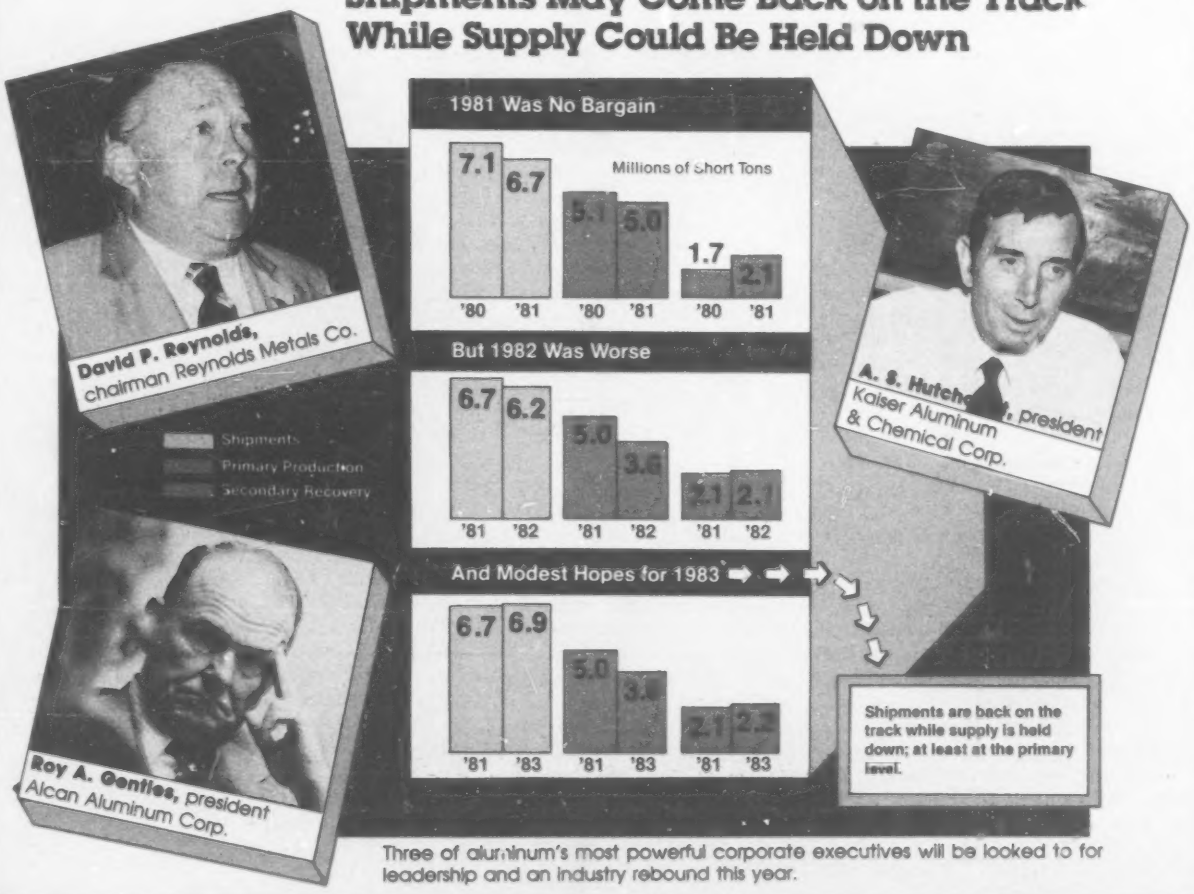
There was no production spree (in the U.S., at least) but 1982 still left a formidable inventory hangover to wrestle with as 1983 progresses. There was no selling spree last year, even with aluminum prices down in the basement. The start of the new year finds consumers not exactly bolting to buy.

And there was a lot of bottom line red ink (before special items) in 1982 that threatens to spill over into the new year, unless the producers can show their customers signs of lessening pressure to sell this year's aluminum at last year's prices.

The industry's New Year's resolutions seem to center on keeping tight clamps on production—the producers entered 1983 running a shade under 60 pct of capacity—and holding out for better prices than were accepted last year when there was a lot of emphasis on maintaining cash flow in the face of bleak business prospects.

Top aluminum executives see things getting better toward or after midyear, but remain uncertain as to the timing and degree of recovery. Projections run anywhere from an 8 to 12 pct gain in shipments on a disastrous 1982. At the top side of this range, shipments this year would be up a few points from 1981. The industry then would be back on the track, although still a bit short of the peaks hit in 1979 and 1980.

The steep downtrend in U.S. primary aluminum production came to a halt during November, but the companies seem pretty determined to stay on the bottom until the inventory situation



Three of aluminum's most powerful corporate executives will be looked to for leadership and an industry rebound this year.

improves and business starts picking up. Some of the producers have been picking up supplementary ingot supplies on the open market; others have been drawing in metal from their overseas units. In either case, the main reason is free market ingot prices well below domestic production costs.

The industry's inventory position started edging downward in August and September, but shipments began edging downward again in September and the incoming order rate took a nosedive in October. Industry sources said the order rate picked up again in November, but nobody was predicting any miracles in the inventory department through the balance of the year.

David P. Reynolds, chairman of Reynolds Metals Co., says, "The top priority for the U.S. aluminum industry in 1983 will be inventory reductions." He said the industry's stocks are projected to drop about 350,000 tons during 1983 under a combination of "continued low operating rates and increased shipments."

James A. Vais, Kaiser Aluminum & Chemical Corp.'s economic and marketing research director, calculates a larger 500,000-ton drop in inventory to about 2.6 million tons this year. His estimate is based on anticipation of an 11.9 pct jump in shipments, static primary production, a slight gain in secondary recovery and somewhat higher ingot and mill product imports.

Not so sanguine is Roy A. Gentles, president of Alcan Aluminum Corp., Cleveland-based subsidiary of Alcan Aluminium Ltd., of Montreal, who sees aluminum shipments up only 8 pct this year. Mr. Gentles also sees secondary recovery up nearly 19 pct this year (Mr. Vais has projected only a 2.6 pct increase) which, combined with a slow drawdown of industry stocks, means "a great displacement of primary demand."

Kaiser Aluminum President Stephen Hutchcraft, Jr. called the growth of recycling "both a problem—as it has been in this downturn—and an opportunity—as it will be in the future."

Mr. Hutchcraft projects a smaller primary aluminum base in the U.S. over the next several years, with some capacity being taken down permanently because of prohibitive energy costs. At last year's annual meeting of the Aluminum Association, of which he is the new chairman, Mr. Hutchcraft said the U.S. will become a larger importer of primary aluminum in the future, with the rate of increase modified according to how fast domestic secondary recovery grows.

He said the U.S. aluminum industry must learn to accept the commodity status of aluminum ingot and direct its efforts toward building competitiveness in the mill product sector. Drawing a parallel with the experience of the Japanese aluminum industry in recent years, namely closing down cost-prohibitive primary smelters and concentrating on fabricating, Mr. Hutchcraft said, "We are going to be a much more competitive industry in the future than we have been in the past. I know that's hard to imagine, but it's true.

"It's true because those master competitors—the Japanese—may be poised to take us on in the markets we think we know best—flat-rolled products."

The aluminum industry's biggest product is beer and soft drink can stock and it is building up into something of a hotly contested arena in 1983. The ingredients include nettlesome competition from the Japanese, growing domestic capacity from new entrants like Anaconda Aluminum, Martin Marietta Aluminum and Noranda Aluminum—and possibly a contracting market in the near term, at least.

'It is time to stop coasting and resharpen marketing skills.'

Industry shipments of can stock in 1981 were a record 1.363 million short tons. Industry sources had projected a 2.7 pct gain to roughly 1.4 million tons in 1982. But late in the year, the estimates were pulled back to about 1.35 million tons, in which case it would mark the first setback since 1975.

The pared 1982 projection jibes with expectations that can stock imports from Japan went up about 50,000 tons for an increase of 100 pct. It also suggests that the overall domestic can stock market didn't grow at all. Meanwhile, earlier expectations that 1983 shipments would hit 1.5 million tons were shaved back to about 1.425 million tons. Meanwhile, projected gains for the next three years, when more can stock capacity will be coming onstream, also have been tucked in a little.

Clearly, the domestic aluminum companies have a lot riding on efforts to put aluminum into other corners of the overall container market, including Continental Can Co.'s resealable soft drink containers, which are being market tested this year, other closable aluminum containers and Reynolds Metals' pressurized containers.

Meanwhile, says Kaiser's Mr. Hutchcraft, the aluminum companies, which "haven't really done much project development or marketing in the past five years," must get back on the track. "Maybe success in the can market spoiled us," he says. "Growth . . . came on so strongly and absorbed so much of the idle flat rolled capacity that excess metal volume was eaten up and there was little apparent need to develop new markets."

It's time, Mr. Hutchcraft adds, to reach for the "next" aluminum product that was left waiting in the wings because it wasn't needed as long as the can market grew. Calling attention to the shift in the Aluminum Association's thrust from issues-oriented programs to market promotion under a "make it with aluminum" banner, he said it is time to stop coasting and resharpen marketing skills.

While Alcan Aluminum's Mr. Gentles was less optimistic about industry shipments in general this year, he was a bit more optimistic in the can sector. Industry shipments of can stock were up about 5.5 pct in 1982, he said, adding that 1983 should see another 3 pct gain. He noted, however, that "new U.S. producers, as well as foreign producers, are beginning to aggressively compete in the market, so can stock is becoming a very crowded—as well as competitive—market."

Mr. Reynolds noted that aluminum has captured 98 pct of the beer can market and 78 pct of the soft drink can market and now is pushing into non-carbonated beverages, foods and some non-food items to keep the ball rolling.

Mr. Reynolds said there are signs that the aluminum industry has reached the bottom of the recession, but "unlike previous business cycles, recovery from 1980-82 recession will be somewhat slower."

He said idle capacity, combined with intense cost-price pressures, eroded or eliminated producer margins on many products during 1982 and "such conditions may persist well into 1983, even with the general economy improving." Getting out of the squeeze, Mr. Reynolds said, first requires the working down of the industry's excessively large inventory, currently more than a six-month supply, to more normal three-to-four month levels.

With a little help from the consuming public, and little restraint from overseas aluminum producers, 1983 could provide the U.S. companies with some days of Auld Lang Syne, worth drinking a cup of kindness to next New Year's Eve. □

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SERPs RIDE TO RESCUE BY SWEETENING MANAGEMENT PENSIONS

Both management incentive and mobility are encouraged by new Supplemental Executive Retirement Plans (SERPs).

BY GEORGE A. WEIMER

First came ERISA, the Employee Retirement Income Security Act of 1974.

Following close behind ERISA, which was partly designed to discriminate against the highly paid, came something called SERPs. That stands for Supplemental Executive Retirement Plans which are designed by companies to restore heftiness to top management pensions in "unqualified" ways. That is, SERPs are not tax-deductible. They are, in effect, promises by boards of directors to make up what ERISA took away from an executive's possible retirement income.

Now comes TEFRA, the big tax reform law passed last August and whose full title is the Tax Equity and Fiscal Responsibility Act of 1982.

While the title doesn't say anything about pensions, this new collection of rules actually supersedes ERISA in terms of limits on qualified pension plans. It also means SERPs have become more important than ever as an inducement to attract top management people to another company, and to keep people where they are.

The use of SERPs is increasing among major industrial companies, according to Towers, Perrin, Forster & Crosby (TPF&C), New York.

Thirty-nine SERPs were reported in the proxy statements of the top 100 U.S. industrial companies, up from 32 such plans reported in 1981.

Designed primarily to provide key executives with pension benefits in addition to those afforded by their companies' qualified pension plans, "SERPs are versatile plans that serve a variety of objectives," says Donald E. Sullivan, TPF&C vice president. "By accelerating the rate at which a pension accrues, a SERP can help induce a mid-career executive to change jobs."

For executives with longer service,

Top 100 Industrial Companies Earnings Base For Pension Benefits

Final Pay Averaging Period	Number of Companies	Total
Final 10 Years	1	1
High 5 in last 15 Years	3	
High 5 in last 10 Years	33	
High 5 Years	30	
Final 5 Years	8	54
High 3 in last 10 Years	15	
High 3 in last 5 Years	2	
High 3 Years	5	
Final 3 Years	1	23
High 4 in last 10 Years	1	1
"Greater of" formula*	5	5
		84
Earnings base not shown	6	6
No benefit table shown	9	9
No pension plan	1	1
		100

*Includes two companies that use the greater of final 5 or high 3 in last 10 years, one company that uses the greater of final 3 or high 3 in last 5 years, one company that uses greater of final 3 or high 3 in last 10 years, and one company that uses greater of high 3 or high 5 in last 10 years.

From: *Top 100 Executive Benefit Study*, TPF&C (Towers, Perrin, Forster & Crosby)

SERPs can make early retirement more attractive and thus open up additional career paths for younger employees, Mr. Sullivan adds.

Mr. Sullivan predicts an increase in the adoption of SERPs during 1983. "Percent tax legislation has lowered the ceiling on pension benefits from qualified plans, to $90,000 from $136,000, as a result, new approaches in providing executive pensions are being sought," Mr. Sullivan says.

SERPs generally provide lifetime benefits that are calculated on the executive's final pay.

The benefits, however, are usualiy offset by income from qualified retirement plans or Social Security.

Here are some examples of supplemental executive retirement plans in metalworking companies:

—Armco Inc.'s system gives executive management members who retire on or after age 62 without at least 5 years of general management service 50 pct of their annual earnings as defined by the qualified plan.

—Boeing Co. provides for a total annual pension for executives who participate in the company's Incentive Compensation Plan calculated under the qualified plan formula. Benefits under this SERP are forfeited if, after retirement, the employee "engages in competitive activity."

—Deere & Co. offers its officers a supplemental pension that equals the average of the highest five annual supplemental bonuses.

—At Dow Chemical Co., executives get a total annual pension equal to 1.4 pct of compensation times years of service up to an amount that would equal the ERISA limit plus 1.0 pct of compensation over that amount for each year of service.

These are typical SERPs and they are clearly designed to get around the 1974 law. They are perfectly legal, but they are not protected. ERISA plans are protected—in terms of bankruptcy, for example. And, according to some legal experts, there is some small possibility that suits will be filed in coming years due to "the changing ability of the corporate entity to pay what it promised."

SERPs are not funded like ERISA plans. They are not "qualified" by IRS as tax deductible and no one knows yet what a retired executive's recourse would be if his former company folded along with his SERP.

The main reason, besides circumventing ERISA, for SERPs has been to attract top management talent. "They're designed to restore the original intent of a pension plan for officers and they require only board action," explains A. Lee Westervelt, director, compensation and benefits, Eaton Corp.

"Eaton has a plan which provides supplemental retirement income to certain officers who do not have the opportunity to accumulate significant amounts of accumulated service with Eaton.

"The amount of the supplement is based generally upon the officer's average final compensation and is reduced by his other earned retirement income including amounts receivable pursuant to the Eaton retirement plans. Nine of the 22 officers are participating in this plan," explains Mr. Westervelt.

Maximum Qualified Annual Pension*

1975	$ 75,000
1976	80,475
1977	84,525
1978	90,150
1979	98,100
1980	110,625
1981	124,500
1982	136,425
1983	90,000
1984	90,000
1985	90,000
1986 and after	90,000 + increase to adjust for inflation

*The Employee Retirement Income Security Act of 1974 and the Tax Equity and Fiscal Responsibility Act of 1982 placed limits on the amount of annual retirement income a company can offer under a qualified (tax deductible) plan.

A spokesman for another company agrees that SERPs were used as inducements. "But right now we're not trying to attract anyone," he says. "Now we're trying to get people here to take early retirement."

Have managers actually lost retirement income by moving a few times?

"I don't know of anybody who has had that happen," says J. Richard Wible, director, technical services, American Society for Personnel Administration (ASPA) in Berea, Ohio. There might be some question about a company's ability to live up to its SERPs, he adds.

"But we're talking about a fairly small elite group of people. Top level people generally aren't job hoppers," Mr. Wible says.

Most experts also don't expect the Congress to take any steps that might alter SERPs. However, as Mr. Wible explains, "the IRS might try more collection efforts on SERPs since they are really deferred compensation."

Nevertheless, he does not consider that likely since the total amount is not large.

TEFRA also introduced the idea of "top-heavy" retirement plans and imposes stricter qualification rules for plans under which more than 60 pct of the cumulative accrued benefits are for key employees or in instances where the accounts of key employees total more than 60 pct of the total of all employees' accounts.

Key employees can include those persons who are officers of the company, the 10 employees owning the largest shares of the company, those who own 5 pct or more of the company, or 1 pct owners who have an annual compensation of more than $130,000, ASPA says.

Top-heavy plans will not be qualified under TEFRA unless they meet several requirements. One is that they provides either 100 pct vesting to all employees after three years of service or graded vesting, beginning with 20 pct after two years of service.

Another requirement is that the plan must provide an employer contribution of at least 3 pct of compensation in each top-heavy year to each participant who is not a key employee.

A further change is in the area of age discrimination. Beginning Jan. 1, the Federal Age Discrimination in Employment Act requires employers with more than 20 employees to offer employees aged 65 to 69, the same health care benefits available to all other employees.

TEFRA also revised the Social Security Act to make Medicare the secondary payer to employer plans.

One upshot of these new pension laws has been to prod employers to seek more employee contributions and responsibility for their own retirement.

"A clear trend in the retirement area is to get employees to contribute more to their own pensions through IRAs and the like," says Eaton's Mr. Westervelt.

However, because of the laws like TEFRA, employers may come under more pressure to reduce employee contributions to medical plans "at a time when there is increased employer interest in greater cost sharing by employees," says ASPA.

So, while the Congress has been concentrating on equity in retirement, the business community has been concentrating on the more basic issue of costs. Top managers seem to have little to worry about because of SERPs and their own planning, but pension and benefit officers are increasingly concerned about the pages and pages of new rules about everybody else. □

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MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age will publish only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit.
Prices for other weeks will continue to be available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter. (For details on these services see ad on p. 48.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective December 27, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	880	1,057	71,674	117,914
Capability Utilization Rate	29.8	35.8	47.3	77.7

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 55.83	$ 52.17	$ 51.17	$ 75.50
No. 2 bundles	$ 39.50	$ 38.50	$ 38.50	$ 54.17
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh .	$ 57.50	$ 52.50	$ 52.50	$ 85.50
No. 1 steel, Philadelphia	54.50	54.50	54.50	66.50
No. 1 steel, Chicago.....	55.50	49.50	46.50	74.50
No. 1 bundles, Detroit..	41.50	41.50	41.50	74.50
Low Phos., Youngstown	51.50	51.50	51.50	85.50
No. 1 mach'y cast., Pgh	61.50	61.50	61.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	111.50
No. 1 mach'y cast., Chi	104.50	104.50	103.50	120.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective December 27, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	Current price	Last price	Date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	71.00	70.00-71.00	12/22/82
Lead	20.50-23.00	19.50-23.00	12/22/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	36.00-40.00	38.00-40.00	12/8/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.25-$1.40
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $457.00
Indium, dollars per troy oz. ..... $2.60-$2.85
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$365-$385
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $10.98
Vanadium $4.94
Zirconium sponge ..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Dec. 20—561.16 Dec. 23—564.33
Dec. 21—561.69 Dec. 24—Holiday
Dec. 22—564.46

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	67⅛	57¼
Yellow brass	58	52⅞
Red brass	61¾	54⅞
Comm. bronze	63	56
Mang. bronze	57½	55¾
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	57
No. 2 copper wire	51
Light copper	41

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	47
Light copper	37
No. 1 composition	50
No. 1 comp. turnings	47
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	26
Radiators	41

Aluminum

New mixed clips	24	—25
Old sheet	23	—24
Old cast	23	—24
Clean dry borings	23	—24

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	22	—23
Mixed L.C. clips	20	—21
Old sheets and cast	14	—15
Borings and turnings	10	—11
Duraluminum clippings	20	—21

Copper and Brass

No. 1 copper wire	46	—47
No. 2 copper wire	39	—40
Light copper	34	—35
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	26	—27
Brass Pipe	28	—29
New soft brass clippings	34	—35

Lead

Heavy soft lead	9	—10
Whole batteries	4	— 5
Type metal	14	—15
Electrotype	18	—19

Nickel

Nickel solids	85	— 90
Nickel rod ends	85	— 90
Nickel sheets, clips	85	— 90
Nickel turnings	40	— 45

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

EFFECTIVE DECEMBER 27, 1982

MATERIALS NEWSFRONT

(Effective December 27, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 57.00	to	$ 58.00
No. 2 hvy. melting	50.00	to	51.00
No. 1 dealer bundles	68.00	to	69.00
No. 1 factory bundles (auto)	68.00	to	69.00
No. 2 bundles	37.00	to	38.00
No. 1 busheling	64.00	to	65.00
Machine shop turn.	6.00	to	7.00
Shoveling turnings	20.00	to	21.00
Cast iron borings	18.00	to	19.00
Low phos. punchings plate	70.00	to	71.00
Heavy turnings	50.00	to	51.00
No. 1 RR hvy. melting	71.00	to	72.00
Rails 2 ft. and under	81.00	to	82.00
Scrap rails, random lgth.	76.00	to	77.00
RR specialties	75.00	to	76.00
No. 1 machinery cast	61.00	to	62.00
Cupola cast	54.00	to	55.00
Heavy breakable cast	30.00	to	31.00
Stainless			
18-8 bundles and solids	410.00	to	420.00
18-8 turnings	310.00	to	320.00

Chicago

No. 1 hvy. melting	$ 55.00	to	$ 56.00
No. 2 hvy. melting	47.00	to	48.00
No. 1 dealer bundles	64.00	to	65.00
No. 1 factory bundles (auto)	66.00	to	67.00
No. 2 dealer bundles	41.00	to	42.00
No. 1 busheling	64.00	to	65.00
Shredder scrap	64.00	to	65.00
Machine shop turn.	14.00	to	15.00
Mixed bor. and turn.	15.00	to	16.00
Shoveling turnings	19.00	to	20.00
Cast iron borings	33.00	to	34.00
Low phos. forge crop	76.00	to	77.00
Low phos. punchings plate ¼ in. and heavier	80.00	to	81.00
Low phos. 2 ft. and under	76.00	to	77.00
No. 1 RR hvy. melting	53.00	to	54.00
Scrap rails, random lgth.	49.00	to	50.00
Reroller rails	87.00	to	88.00
Rails, 2 ft. and under	76.00	to	77.00
RR couplers and knuckles	70.00	to	71.00
RR car axles	99.00	to	100.00
No. 1 machinery cast	104.00	to	105.00
Cupola cast	90.00	to	91.00
Stove plate	78.00	to	79.00
Steel car wheels	57.00	to	58.00
Stainless			
18-8 bundles and solids	390.00	to	390.00
18-8 turnings	280.00	to	290.00
430 bundles and solids	90.00	to	95.00
430 turnings	65.00	to	70.00

Philadelphia

No. 1 hvy. melting	$ 53.00	to	$ 56.00
No. 2 hvy. melting	48.00	to	51.00
No. 1 dealer bundles	67.00	to	70.00
No. 2 dealer bundles	38.00	to	41.00
No. 1 busheling	67.00	to	70.00
Shredder scrap	65.00	to	68.00
Machine shop turn.	18.00	to	21.00
Mixed bor. and turn.	18.00	to	21.00
Shoveling turnings	31.00	to	34.00
Clean cast chemical borings	40.00	to	43.00
Low phos. 5 ft. and under	64.00	to	67.00
Low phos. 2 ft. punchings	85.00	to	88.00
Electric furnace bundles	79.00	to	82.00
RR specialties	74.00	to	77.00
Rails, 2 ft. and under	89.00	to	92.00
Cupola cast	56.00	to	59.00
Heavy breakable cast	53.00	to	56.00
No. 1 machinery cast	97.00	to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 36.00	to	$ 37.00
No. 2 hvy. melting	34.00	to	35.00
No. 1 dealer bundles	41.00	to	42.00
No. 2 bundles	18.00	to	19.00
No. 1 busheling	40.00	to	41.00
Drop forge flashings	21.00	to	22.00
Machine shop turn.	14.00	to	15.00
Mixed borings and turn.	7.00	to	8.00
Shoveling turnings	14.00	to	15.00
Cast iron borings	5.00	to	6.00
Heavy breakable cast	24.00	to	25.00
Mixed cupola cast	40.00	to	41.00
Automobile cast	58.00	to	59.00
Stainless			
18-8 bundles and solids	320.00	to	325.00
18-8 turnings	220.00	to	225.00
430 bundles and solids	70.00	to	80.00

Youngstown

No. 1 hvy. melting	$ 44.00	to	$ 45.00
No. 2 hvy. melting	29.00	to	30.00
No. 1 dealer bundles	50.00	to	51.00
No. 2 dealer bundles	29.00	to	30.00
Machine shop turn.	2.00	to	3.00
Shoveling turnings	7.00	to	8.00
Low phos. plate	51.00	to	52.00
Electric furnace bundles	51.00	to	52.00
Galvanized bundles	41.00	to	42.00

Cleveland

No. 1 hvy. melting	$ 46.00	to	$ 47.00
No. 2 hvy. melting	24.00	to	25.00
No. 1 dealer bundles	48.00	to	49.00
No. 1 factory bundles	56.00	to	57.00
No. 2 bundles	22.00	to	23.00
No. 1 busheling	49.00	to	50.00
Machine shop turn.	2.00	to	3.00
Mixed bor. and turn.	2.00	to	3.00
Shoveling turnings	5.00	to	6.00
Cast iron borings	5.00	to	6.00
Cut structural & plates, 2 ft. and under	68.00	to	69.00
Low phos. punchings plate	68.00	to	69.00
Drop forge flashings	33.00	to	34.00
Foundry steel, 2 ft. & under	59.00	to	60.00
No. 1 RR hvy melting	63.00	to	64.00
Rails, 2 ft. and under	82.00	to	83.00
Rails, 18 in. and under	83.00	to	84.00
Steel axle turnings	69.00	to	70.00
Railroad cast	82.00	to	83.00
No. 1 machinery cast	79.00	to	80.00
Cupola cast	62.00	to	63.00
Stove plate	47.00	to	48.00
Stainless			
18-8 bundles	275.00	to	285.00
18-8 turnings	225.00	to	235.00
430 bundles	75.00	to	85.00

Buffalo

No. 1 hvy. melting	$ 25.00	to	$ 26.00
No. 2 hvy. melting	15.00	to	16.00
No. 1 busheling	30.00	to	31.00
No. 1 dealer bundles	28.00	to	29.00
No. 2 bundles	12.00	to	13.00
Machine shop turn.	1.00	to	2.00
Mixed bor. and turn.	8.00	to	9.00
Shoveling turnings	10.00	to	11.00
Cast iron borings	8.00	to	9.00
Low phos. plate	48.00	to	49.00
Structural and plate, 2 ft. and under	46.00	to	47.00
Rails, 2 ft. and under	42.00	to	43.00
Scrap rails, random lgth.	22.00	to	23.00
No. 1 machinery cast	63.00	to	64.00
No. 1 cupola cast	42.00	to	43.00

St. Louis

No. 1 hvy. melting	$ 47.00	to	$ 48.00
No. 2 hvy. melting	39.00	to	40.00
Foundry steel, 2 ft.	39.00	to	40.00
No. 1 dealer bundles	47.00	to	48.00
No. 2 bundles	36.00	to	37.00
Machine shop turn.	12.00	to	13.00
Shoveling turnings	18.00	to	19.00
Cast iron borings	30.00	to	31.00
No. 1 RR hvy. melting	47.00	to	48.00
Rails, random length	49.00	to	50.00
Rails, 18 in. and under	64.00	to	65.00
RR specialties	80.00	to	81.00
Cupola cast	70.00	to	71.00
Heavy breakable cast	48.00	to	49.00
Stove plate	70.00	to	71.00
Cast iron car wheels	49.00	to	50.00
Rerolling rails	84.00	to	85.00
Unstripped motor blocks	55.00	to	56.00

Birmingham

No. 1 heavy melting	$ 54.00	to	$ 55.00
No. 2 heavy melting	52.00	to	53.00
No. 1 dealer bundles	54.00	to	55.00
No. 2 bundles	40.00	to	41.00
No. 1 busheling	54.00	to	55.00
Shredder scrap	69.00	to	70.00
Machine shop. turn.	18.00	to	19.00
Shoveling turnings	25.00	to	26.00
Cast iron borings	26.00	to	27.00
Electric furnace bundles	53.00	to	54.00
Elec. furnace, 3 ft. & under	50.00	to	51.00
Structural and plate, 2 ft.	70.00	to	71.00
Structural and plate, 4 ft.	66.00	to	67.00
No. 1 RR hvy. melting	54.00	to	55.00
Scrap rails, random lgth.	52.00	to	53.00
Rails, 18 in. and under	73.00	to	74.00
Angles and splice bars	65.00	to	66.00
No. 1 cupola cast	74.00	to	75.00
Unstripped motor blocks	52.00	to	53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 27.00	to	$ 28.00
No. 2 hvy. melting	26.00	to	27.00
No. 1 dealer bundles	28.00	to	29.00
No. 2 bundles	14.00	to	15.00
Machine shop turn.	1.00	to	2.00
Shoveling turnings	3.00	to	4.00
Cast iron borings	4.00	to	5.00
Low phos. 18 in. and under	52.00	to	53.00
Rails, random length	34.00	to	35.00
Rails, 2 ft. and under	59.00	to	60.00
No. 1 cupola cast	44.00	to	45.00
Heavy breakable cast	20.00	to	21.00
Drop broken cast	59.00	to	60.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 26.00	to	$ 27.00
No. 2 hvy. melting	22.00	to	24.00
No. 2 dealer bundles	22.00	to	23.00
Mixed bor. and turn.	7.00	to	8.00
Machine shop turn.	4.00	to	5.00
Shoveling turnings	10.00	to	12.00
Clean cast. chem. borings	34.00	to	35.00
No. 1 machinery cast	89.00	to	90.00
Mixed yard cast	38.00	to	39.00
Heavy breakable cast	14.00	to	15.00
Stainless			
18-8 prepared solids	360.00	to	365.00
18-8 turnings	255.00	to	275.00
430 prepared solids	70.00	to	80.00
410 solids	60.00	to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00	to	$ 30.00
No. 2 hvy. melting	20.00	to	22.00
No. 1 dealer bundles	28.00	to	30.00
No. 2 bundles	16.00	to	18.00
No. 1 busheling	28.00	to	30.00
Shredder scrap	38.00	to	40.00
Machine shop turn.	1.00	to	2.00
Shoveling turnings	1.00	to	2.00
No. 1 machinery cast	100.00	to	105.00
Mixed cupola cast	23.00	to	25.00
Heavy breakable cast	4.00	to	6.00

San Francisco

No. 1 hvy. melting	$ 39.00	to	$ 41.00
No. 2 hvy. melting	31.00	to	33.00
No. 1 dealer bundles	26.00	to	28.00
No. 2 dealer bundles	11.00	to	13.00
Machine shop turn.	4.00	to	6.00
Cast iron borings	4.00	to	6.00
No. 1 cupola cast	83.00	to	85.00

Los Angeles

No. 1 hvy. melting	$ 38.00	to	$ 40.00
No. 2 hvy. melting	27.00	to	29.00
No. 1 dealer bundles	25.00	to	27.00
No. 2 dealer bundles	8.00	to	10.00
Machine shop turn.	4.00	to	6.00
Shoveling turnings	8.00	to	10.00
Cast iron borings	4.00	to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00	to	86.00
No. 1 cupola cast	86.00	to	88.00

Seattle

No. 1 hvy. melting	$ 53.00	to	$ 55.00
No. 2 hvy. melting	42.00	to	44.00
No. 2 bundles	32.00	to	34.00
No. 1 cupola cast	88.00	to	90.00
Mixed yard cast	78.00	to	80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 33.00
No. 2 heavy melting cut 2 ft. and under	30.00
No. 1 dealer bundles	40.00
No. 2 bundles	5.00
Mixed steel scrap	17.00
Bush. new fact. prep'd.	38.00
Bush. new fact. unprep'd.	30.00
Machine shop turn.	18.00
Short steel turn.	21.00
Mixed bor. and turn.	10.00
Cast scrap	30.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 50.00	to	$ 51.00
No. 2 hvy. melting	38.00	to	39.00
No. 2 bundles	28.00	to	30.00
Machine shop turn.	8.00	to	9.00
Crushed turnings	17.00	to	19.00
Shredder scrap	50.00	to	51.00
Cut structural plate 2 ft. and under	72.00	to	74.00
Unstripped motor blocks	55.00	to	57.00
Cupola cast	64.00	to	66.00

Chilton's
JANUARY 21, 1983

IRON AGE

THE MAGAZINE FOR METALWORKING MANAGEMENT

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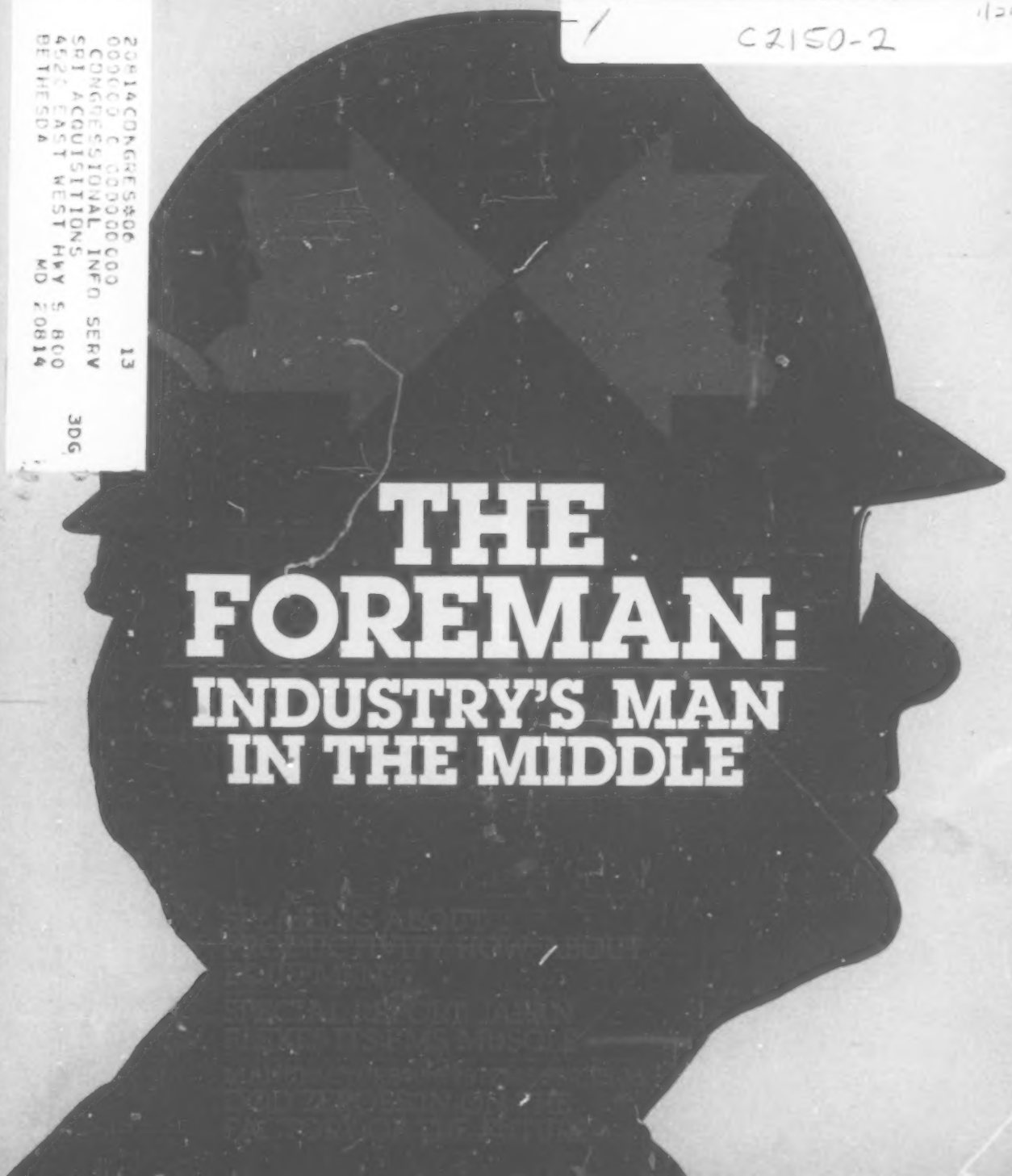

THE FOREMAN: INDUSTRY'S MAN IN THE MIDDLE

VOL. 226, NO. 3

IRON AGE

JANUARY 21, 1983

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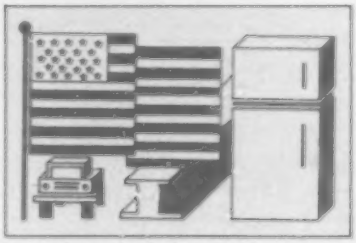

Domestic content legislation—why it won't fly

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FOR NICKEL, 1983 WILL BE MAKE IT, OR BREAK IT

The usual obstacles exist—inventories, interest rates, price pressures and lackluster consumption.

BY ROBERT J. REGAN

The nickel industry can't quite see the light at the end of the tunnel yet—but it knows it's there. Meanwhile, producers find themselves forced to grope past the same sort of obstacles that impeded the path through 1982.

The familiar obstacles include nettlesome inventories, interest rates, price pressures from merchants and the London Metal Exchange, Russian sales and, last but not least, lackluster consumption.

With large chunks of their mining, smelting and refining operations idle, the producers are loath to see things only in terms of overcapacity. Here the assessments vary as widely as definitions of true, nameplate and practicable capacity. And more recently there has been more willingness to discuss things—theoretically, at least—in terms of survivable capacity.

Inco Ltd. Chairman Charles F. Baird put it succinctly at a recent meeting with security analysts in New York during a discussion of various nickel market scenarios when he said 1983 is "likely to be a kind of make-or-break year for a lot of people in the industry."

In the same vein, Mr. Baird observed that, if the L.M.E. price stayed in a range of $1.50 to $1.60 a lb very long, "I would predict that a great many producers will go down, because many of them will be producing at costs that would not only exceed the price at which they are selling—I'm talking about cash costs—but also foreign exchange costs would exceed the price at which they are selling. How long their sponsors would allow that to go on is hard to say."

Mr. Baird added, however, that "things change and we wouldn't expect current (price) trends to continue, particularly if there is an upturn in demand generally—and in people's outlooks." At that point, a Wood Gundy research analyst observed that, if the nickel price remained well under $2 a lb, well below Inco's cash costs, it would seem advisable not to produce in order to lessen the cash drain. Swinging the hypothetical discussion in the other direction, he then asked "looking at another scenario, does it pay to produce to encourage some of the marginal producers to get out a little sooner?"

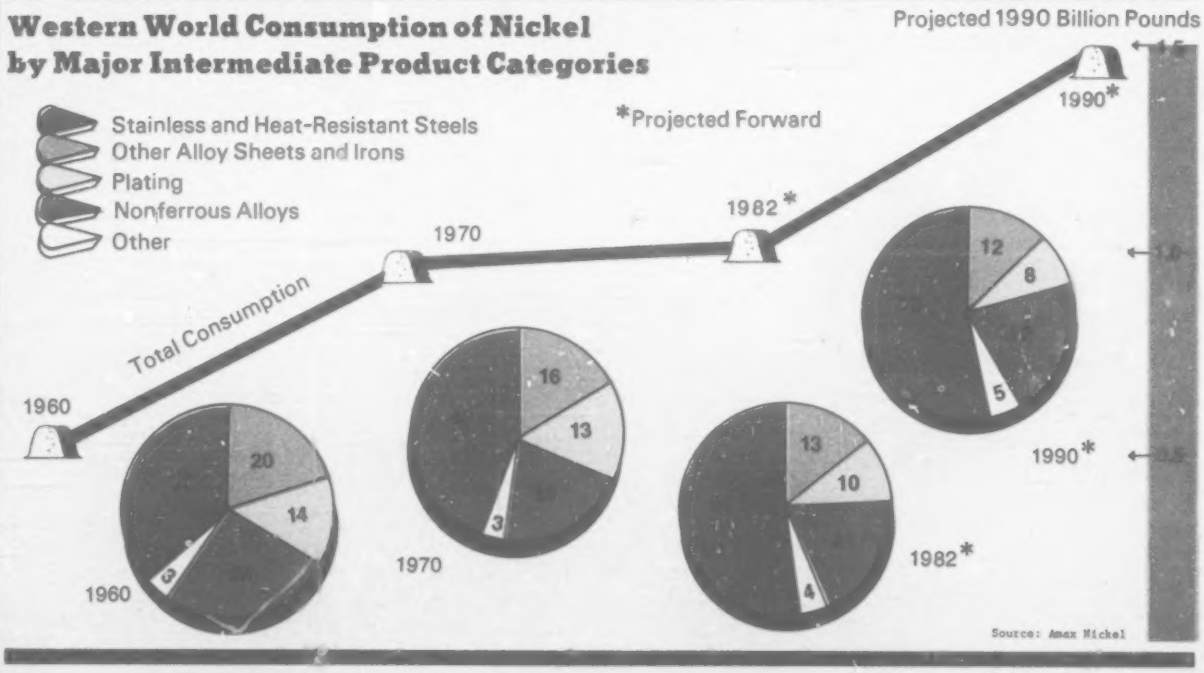
Mr. Baird replied that this was the sort of question Inco "wrestles with every day and it gets tougher to make these computations because not all of us in the business are worried about the same kinds of concerns. Not all of us face the financial marketplace, but that's the kind of trade-off we have to worry about."

The Wood Gundy analyst then speculated that, if Inco helped Amax Nickel reduce inventory and help take materials close to production, "you'd be driving them deeper into a cash hole—you'd have nickel at a much lower price . . . you can't lose, except when you want $3 a lb."

Mr. Baird assented, adding "it's a very difficult set of computations, but something, we think, is likely to happen in a variety of directions in 1983. It's likely to be a kind of make-or-break year for a lot of people in the industry."

The L.M.E. price had zig-zagged its

Western World Consumption of Nickel by Major Intermediate Product Categories



way up to $1.72 a lb by the start of 1983, but was sagging back toward $1.60 a lb as the first week of the new year drew to a close.

Inco calculates that noncommunist world demand for nickel fell back to 1.0 billion lbs last year but should climb back up to 1.1 billion lbs this year—which would put it only back where it was in the middle of the industry's first three-straight-years drop since World War II.

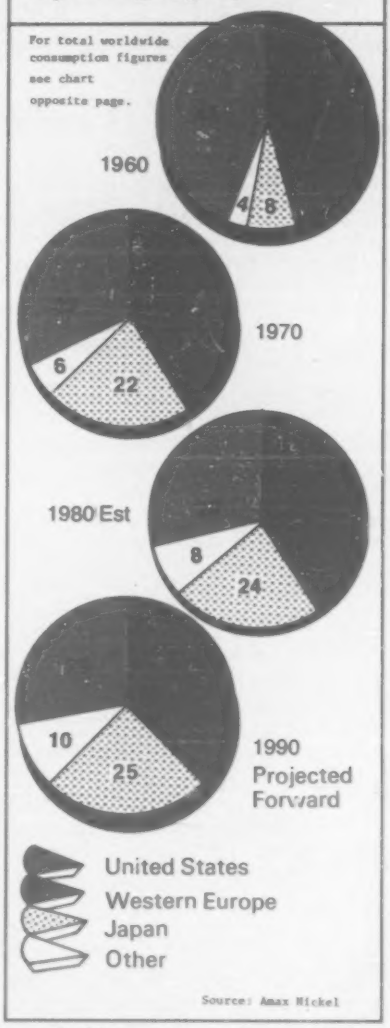
Amax Nickel, which has scheduled a two-month summer shutdown for its Port Nickel, La. refinery, doesn't expect much increase in nickel consumption in the U.S. Overall western bloc nickel consumption, says James Alward, manager, marketing research, "is expected to be around 1 billion lbs—some 20 million lbs more than in 1982." Noting that this is almost entirely based on current economic forecasts (in Amax Nickel's case, Chase Econometrics and Townsend-Greenspan), Mr. Alward said most of the modest increase forecast for U.S. industrial production will take place in the last quarter. "Assuming a time lag of at least several months between variations in industrial production and nickel consumption, we feel that little, if any increase in nickel consumption will be evident in the U.S. in 1983." Mr. Alward also said Japanese nickel use should be up 2 pct, based on forecasts of a 4.6 pct increase in industrial production there.

Michel Frippel, director of marketing for Amax Nickel, said it is difficult to say whether there will be a restructuring of the world nickel industry without knowing how long the present economic slump will last. "Obviously, if it continues for a few years, quite a few companies will be shut down. The largest companies are not necessarily those that will survive the longest, however. Companies don't fail mainly because of market conditions. They fail mainly because of an internal deteriorating financial structure and, in particular, cash flow problems," he says.

Mr. Frippel also observed that a mine shutdown does not mean that a facility will cease production over an extended period of time because, "when prices rise, these operations can usually be brought back in a short period."

L.G. Bonar, vice president, marketing and sales for Falconbridge Nickel Mines Ltd., sees practicable western world nickel capacity a lot less than it appears. "Add up all the known nameplate capacity and you get something like 1.7-1.8 billion lbs, but a lot of the capacity now idle will require millions of dollars and a lot of time to turn around. Figuring on a basis of a three-month turnaround, I would estimate practicable capacity at about 1.3 billion lbs," he said.

Nickel Consumption by Geography



Mr. Bonar said the nickel industry still faces just about the same set of problems that existed last year, but finds them smaller in scope. He said last year's production cutting should start showing up in this year's inventory numbers, "and producer stocks have been the driving force behind the pressures on the nickel price." The Falconbridge official said it is difficult to say what effect a static consumption picture will have in the nickel-producing community because no one can predict what sort of rescue operations would be mounted by interested parties, be they governments, creditors or parent companies.

As far as the present supply/demand situation is concerned, Mr. Frippel said "the good news is that, for the first time in many years, no one is investing in new nickel capacity. The bad news is that today's western bloc effective capacity is some 60 pct more than western bloc nickel consumption."

Mr. Frippel estimated effective western nickel capacity, including capacity that could be brought back onstream in one year, at about 1.6 billion lbs. He also noted that Amax Nickel now is estimating a growth rate of somewhat under 3 pct a year over the next 10 years. A year earlier, Amax Nickel was forecasting a 3.7 pct growth rate. Mr. Frippel said long term forecasts usually are based on economic and technological factors and, while the company has been reasonably accurate on the technological front, the 3.7 pct figure had to give way to continually revised economic projections.

Mr. Frippel said nickel inventories "are fairly low in both consumers' and producers' hands so that, if nickel consumption increases fairly rapidly, they could be a temporary tightening of the distribution pipeline and a building of inventories in consumers' hands.

"The problem is that most companies involved in either consuming or producing nickel lack the financial resources to purposely build up inventories at this time."

The Amax Nickel official said the problems encountered by western bloc mining and metals companies today "are not due to any inherent fault in management, whether in the U.S., Japan or Europe. Certainly some companies have been managed better than others, but even the better-managed firms are in trouble. I doubt very much that any nickel producer is making a profit in today's market—and, to make matters worse, world growth trends are just not there.

"The economies of the western world are in bad shape and until they pick up we all will be in trouble. The nickel industry cannot sell to a non-consuming stainless steel industry; the stainless steel industry cannot sell to a non-consuming capital goods industry; the capital goods industry cannot sell to a non-consuming consumer goods industry and the consumer goods industry cannot supply a non-consuming consumer.

"We are all fighting for a decreasing piece of the consumption pie but only elected officials at top levels can eventually succeed in increasing the size of that pie. If they fail to do so—and I don't think that will be the case—more than the world's nickel industry will be in trouble." □

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METALWORKING ORDER TRENDS

Here and there a good sign, but not enough to spring a recovery

Orders for durable goods, including metalworking, were up in November.

But those in the cheering section were still sitting on their hands. They have been through the monthly up-and-down routine too long to get stirred up by another upward blip in the orders chart.

The weary waiters for recovery are acutely aware that in the 11 months of 1982 that have been reported on, orders rose in five of the months and fell in six.

And they know that November followed a weak month for orders. In October, orders were down by more than 5 pct from the previous month.

What is needed now is about three straight months of solid, across-the-board gains. Then, the cheering section might throw some hats in the air.

November could be the start of something, of course. Orders did move up. Orders received by durable goods producers came to $70.6 billion, up 1.4 pct from October. And the November gain was the third one over the last five-month period.

In November—as has held true enough through recent months—there did not appear to be any one metalworking industry taking a role in leading a rally out of the recession. Orders in some industries were up; others were down. Some gains, on a percentage basis, did look promising.

Orders for electrical machinery scored an 8.2 pct gain in November. In this industry group, the largest increase in orders was for defense communications systems.

New orders received by primary metals producers rose by 7.9 pct in November. That was the largest one-month increase for metals orders since January 1980.

Transportation equipment orders broke out of a three-month slide with a modest 1.5 pct increase in November. Within this industry group, orders for motor vehicles and parts were down.

Also down in November, were orders for nonelectrical machinery. These took a sharp decline of more than 6 pct. And this fall was led by a 26 pct drop in orders for machine tools.

It seems the wait for recovery in metalworking may have some time to go. Consumer buying, it appears, is not yet strong enough to push orders through the long supply pipeline back to heavy goods producers.

So far, consumer savings are on the rise, but not spending.

Source: U.S. Dept. of Commerce Billions of dollars, seasonally adjusted monthly total, unless otherwise noted	Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
Capital Expenditures (Annual Rates)			
U.S. Industry, Total	4th Qtr.	$324.5*	$320.2	$327.8
Manufacturing, Total	4th Qtr.	122.9*	123.1	126.9
Manufacturing, Durable Goods	4th Qtr.	58.8*	60.0	60.8
Mining Industry	4th Qtr.	16.2*	15.7	16.8
Key Indicators, Durable Goods Manufacturing				
New Orders	Nov.	70.6	69.6	80.0
Shipments	Nov.	72.7	72.3	81.6
Inventories	Nov.	179.5	181.8	187.3
Unfilled Orders	Nov.	281.9	284.0	311.0
New Orders, Metalworking				
Capital Goods Producers, Nondefense Industries	Nov.	20.2	20.2	23.8
Capital Goods Producers, Defense Industries	Nov.	4.9	4.8	4.9
Primary Metals, Total	Nov.	7.5	6.9	10.0
Steel (SIC 331)	Nov.	3.1	2.8	5.1
Iron & Steel Castings (SIC 332)	Nov.	0.7	0.6	.9
Nonferrous Metals	Nov.	3.7	3.5	4.0
Nonelectrical Mach.-Equip. Industries, Total	Nov.	13.0	13.8	17.5
Engines & Turbines	Nov.	1.0	1.2	1.3
Farm Machinery & Equipment (Shipments)	Nov.	1.1	1.0	1.2
Construction, Mining & Materials Hdlg. Equip.	Nov.	2.4	2.0	3.6
General Industrial Machinery	Nov.	1.0	1.0	1.4
Fluid Power Equipment** (Index-1972=100)	Nov.	171	146	241
Metalworking Machinery	Nov.	0.6	0.6	0.6
Machine Tools, Total (Millions $, unadjusted)***	Nov.	88.2	119.2	195.8
Machine Tools, Metal-Cutting***	Nov.	62.7	72.9	135.4
Machine Tools, Metal-Forming***	Nov.	25.5	46.3	60.4
Electrical Mach. & Equip. Industries, Total	Nov.	12.0	11.1	11.9
Elec. Transmission Equip. & Industrial Apparatus	Nov.	1.8	1.5	2.0
Household Appliances	Nov.	1.1	1.0	1.1
Communication Equipment	Nov.	4.2	3.7	3.7
Transportation Equip. Industrial, Total	Nov.	14.5	14.3	15.4
Motor Vehicles & Parts (Shipments)	Nov.	8.1	7.9	10.0
Aircraft, Missiles & Parts	Nov.	5.2	5.1	4.0
Shipbuilding & Military Tanks	Nov.	0.9	0.7	1.2
Fabricated Metal Products, Total	Nov.	8.3	8.3	9.3
Instruments, Total	Nov.	3.8	3.7	4.4

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA.

INDUSTRY'S MAN

The foreman—always management's point man on the shop floor—is really on the spot in the fiercely competitive 1980s. Here's a plan to help him both survive and thrive.

BY PAUL CATHEY

The first-line supervisors—long known as the men (or women) in the middle—face a staggering challenge in the 1980s.

Middle and top management will be after them to boost productivity, reduce costs and improve quality. And they'll be expected to prove that American workers *can* compete successfully in the global manufacturing race.

In short, foremen will be asked—more than ever before—to make management's goals crystal clear to the workers. And, as it always has been, this will be difficult unless management learns how to communicate with the foremen and trains them to pass along information.

Increasing the foremen's problems in coming years will be the job of directing a work force that will include some robots. And looming up is the factory of the future—that electronics-laden workplace where machines could outnumber people by a wide margin. Even these advanced manufacturing centers will require some sort of first-level supervisor—a sophisticated foreman or possibly a technology steward.

Ever since management decided there had to be a leader on the job floor, the first-line supervisor has been in no-man's land. He's been called "the forgotten man," "the master and victim of double talk," "the marginal man," and other names even less complimentary.

He belongs to everyone—management, the workers, the union (if there is one)—but no one trusts him completely. And, as management's point man in these turbulent times, he's more endangered than ever before.

It's time management recognized that the leader in the trenches is not expendable. He's vital to success in the manufacturing and marketing wars now taking place on a global basis. In this age of video games, the strategy for winning may be management's, but the joy stick operator is the first-line supervisor.

Is there a sound program for making today's, and tomorrow's foreman the kind of point man industry needs? *Iron Age*, based on interviews with corporate managers and consultants, believes there is. Here are its four principal features:

1—Communication with the foreman must be given A-1 priority. And the foreman must be trained, extensively, to communicate with his workers.

"We've been making the same mistake for years," says Roger D'Aprix. He's practice leader for communication at management consultants, Towers, Perrin, Forster & Crosby. And for more than a decade he was manager of employee communication for the business systems group of Xerox Corp.

"We've been haranguing supervisors and foremen on the need to communicate better," he adds. "But we don't tell them what we mean by communication. It's a Catch-22 situation."

Last year, TPF&C and the International Assn. of Business Communicators (IABC) surveyed over 32,000 employees in 26 companies on the subject of communications.

That survey found some surprising differences between how employees prefer to obtain their information and where they actually got it. It also indicated that some of the preferred sources were presently responsible for only a

Where Employees Really Get Their

IN THE MIDDLE

small portion of the information received. (See chart, this page)

The employee's immediate supervisor, for example, was asked to supply more than 90 pct of organizational information, but only came through with a little more than 50 pct. And that ageless, but often accurate, unoffical source of company information—the grapevine—was a source for close to 40 pct of current information. Because of the importance of the role of the supervisor as a source of information, the survey asked employees four questions in that area.

Here are the percentage breakdowns of the answers:

	Pct Agreeing	Pct Disagreeing
My supervisor keeps me well informed	64.9	24.2
My supervisor is kept informed by higher management.	63.3	27.9
My supervisor discusses my job performance once a year.	70.1	25.1
My supervisor lets me know when I do a good job.	59.2	29.2

Clearly there is room for improvement. The results indicate that blue collar workers feel they receive little regular (at least annual) feedback on job performance and, generally, fewer "pats on the back" for a job well done than white collar employees.

Mr. D'Aprix points out that the five sources of information which employees said need the greatest strengthening—top executives, immediate supervisors, orientation programs, small group meetings and upward communication programs—are all face-to-face communication situations.

"Training foremen to give information to the workers won't work," he says, "if they aren't trained how to get information from the workers and if they aren't rewarded for doing a good job as two-way communicators."

The IABC/TPF&C study notes, "Many organizations can improve supervisory communications by giving them the tools they need to be good communicators. These include a steady flow of information about management decisions that affect employees, a good sourcebook on organizational policies and procedures, and training in listening, presentation and other communications skills. And since small group meetings are another highly preferred communication source, organizations might wish to help or train supervisors to conduct such meetings."

2—**Even in this time of advanced technology, the foreman's grasp of human behavior and interpersonal relations must be improved.**

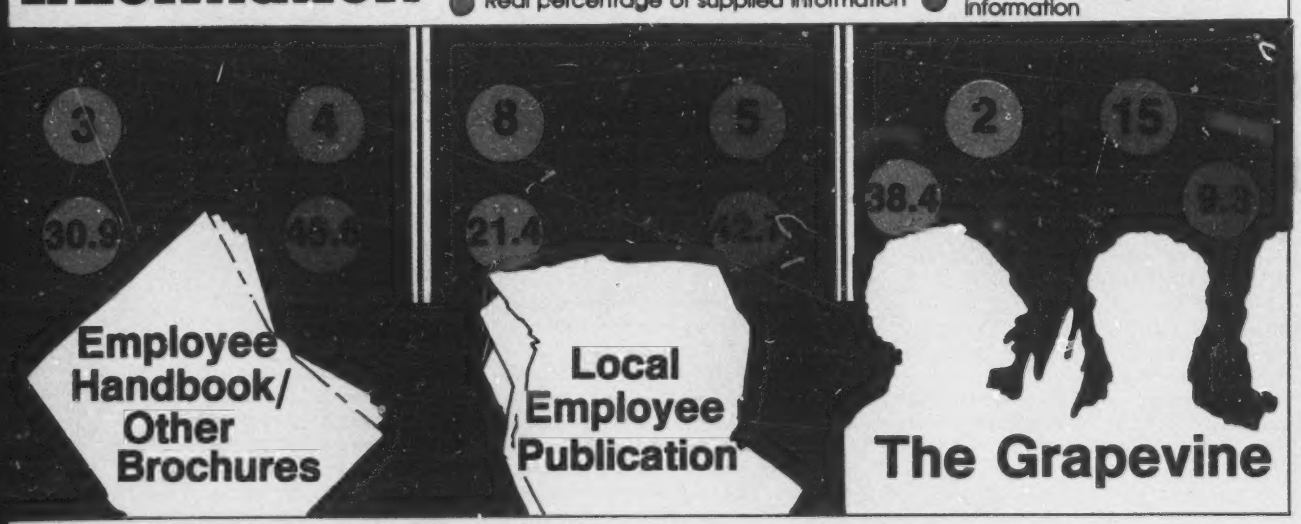
It's certainly true that the foreman must improve his technical knowledge of the work and the machines that do it. Bawling out a robot won't get it back to work after a malfunction. But when it comes to introducing a robot on the line, the foreman will be explaining it to human workers. And management had better prepare him for that task.

"I've seen in countless situations," says Kenton Hofmeister, "a worker or supervisor standing by a robot and saying 'I could have told them the damn thing wouldn't work, but nobody asked me.'" Mr. Hofmeister is manager of consulting services of the supervisory programs group at Development Dimensions International (DDI), consultants specializing in selecting, training and developing managers and supervisors. Previously, he helped direct the introduction of robots into Westinghouse and into Dayton Power and Light.

"There are three ways you can introduce change," he says. "You can ask people, you can tell people or you can surprise people. And people don't like surprises."

He believes the foreman can be management's greatest ally in introducing a robot, or any other change, if he's taken into management's confidence early.

"It's a matter of how you introduce a change," he points out. "Management must first explain to supervisors the reason for making the change, create the climate for making the change, help them understand the problem, ask for



How Armco Trains Foremen

Over a decade ago, Armco Inc. (then Armco Steel) suspected it had a foreman problem.

William J. Saunders, Jr., now executive director of Armco's education center, was then manager of personnel development. He describes what happened.

"Initially," he says, "some simplistic solutions were suggested such as higher base rates, better incentives, overtime compensation and others.

"But the more we looked at the situation, the more we realized we had to have more information and the best source was the foreman himself."

This led to a series of surveys, each revealing the need for another. Both turn foremen and general foremen were questioned about the nature of the job, the most important activities, and what skills a foreman needed to perform the job efficiently.

For answers to the last, Armco went to the company's training supervisors. In addition to knowledge of the specific job and its relation to other operations, managerial knowledge was needed in such areas as planning, organization, leading and control, some economics, and all the communications skills—reading, writing, listening and speaking.

Armco decided the managerial aspect of the job needed the most attention and decided to concentrate on it.

Among the measures taken was setting up an assessment center in order to better select foremen. The job candidates go through training exercises under scrutiny of Armco assessors who determine how well the candidates can handle the duties they would face on the job.

"There are many, many dimensions of behavior we could test," says Mr. Saunders, "but the more you look at, the harder it is to evaluate them. We settled on six as most important—controlling, decision-making initiative, leadership, oral communications, planning and personal adaptability."

The program was phased in at one of Armco's steel plants and has since spread to the rest of its mills as well as to some of its non-steel operations. The program is controlled at the corporate level, but most of the formen are selected at the plant sites.

their input, and get their views on the best way to explain the change to the workers. If you do all that, they're more likely to buy into the solution—and push it on the floor."

William C. Byham, president of Development Dimensions, says failures in installing robots usually happen when workers, supervisors and middle managers are not involved in the installation decision.

He lists these reasons why a supervisor would fear installation of a robot:

—Possible loss of a job.

—Difficulty in correcting production errors.

—Having no one to do non-routine tasks, so the supervisor ends up doing them.

—Loss of self-image resulting from managing machines.

—Loss of status when status is defined by the number of employees reporting to him.

—Loss of the challenge that comes from effectively managing people.

—A lack of perceived expertise because the supervisor often cannot fix the robot or doesn't know as much about it as a subordinate.

He indicates that the introduction of robots or automatic work machines onto the shop floor may give rise to a whole new set of problems. He relates one instance where switching over to automatic machines cost the supervisor a pay increase. The reason: Although the quality and volume of the work processed improved, the supervisor was now directing only six people, rather than the previous twelve.

Needless to say, the unions are keeping a close watch of situations like this. They have no intention of letting technological changes rob them of hard-won gains on the shop floor. They intend to be involved in the changes, not bypassed by them. Recently, the International Association of Machinists (IAM) announced it hopes to use technology stewards to monitor the introduction of advanced techniques in the workplace. The use of these stewards, who would be trained by the union, will be brought up this year at IAM negotiations with the machine tool, aerospace and electronics industries.

3—Selection of new foremen can no longer be made on a hit-or-miss basis—the job has become too important.

Picking the fastest or most efficient worker and making him foreman may have been fine 80 years ago, but it makes absolutely no sense in today's highly competitive world.

It can be as direct a route to failure as making the best salesman a sales manager and watching him drown in a sea of paperwork. The best way to see if a man or woman has the innate qualities to be a supervisor is to give him or her a taste of what the job involves. Interestingly, some aspirants who want to be tested and do well at it, find the duties distasteful and change their minds!

The model employee may fit into this category because, always being on time and doing his work well, he never has a chance to directly experience the supervisor at his worst—bawling workers out. And performing such duties may be repugnant to him.

Dr. Byham points out that in testing both women and men for supervisory positions, women, in the aggregate, tend to score a little higher than the men. This doesn't indicate that an individual woman is better than a man, he says, it merely reflects the fact that only the best female employees try out for the job.

Wiliam J. Saunders, Jr. is executive director of the Armco Education Center at Armco Inc. and has overall responsibility in helping to select supervisors as well as other managers.

He makes this interesting observation about leadership behavior as it shows up among candidates being tested. "You notice four types," he says. "First, there's the individual who seeks leadership and gets it from others. Then, there's the person who seeks it, but can't develop followers—there's no followship.

"Third, there's the one who doesn't want leadership and doesn't get it. And finally, there's the person who doesn't seek it, but nevertheless, people gravitate to him—the charismatic leader."

Armco, along with many other companies, uses the assessment center approach in selecting supervisors—giving them a taste of the job beforehand to see how well they can do it and whether they actually want to do it. (For details on how this works at Armco, see box, this page.)

4—Training a foreman—one recently selected or an existing one—is a complex, time-consuming operation that cannot be left to chance. And to be effective it must extend back up the management ladder all the way to the top.

Ronald W. Metz is human resource development manager on the industrial relations staff at Florida Steel Corp. "Over the years," he says, "the first-line supervisor has been grosaly underrated by too many companies.

"Now organizations are beginning to realize that sound training and development of supervisors can really pay off. A passive attitude on management's part is no longer possible.

"But," he adds, "the training can't

begin and end at that level. We also train second-line supervisors on how to reinforce and support the skills the first-line supervisors are developing. And we carry that participation in reinforcement of managing techniques developed on the job floor right up to division superintendents and beyond."

Florida Steel uses a program originated by Development Dimensions called interaction management. It's a behavioral modeling approach designed to help supervisors deal with five basic situations critical to their jobs. These are: improving employee performance and work habits, dealing with absenteeism, handling emotional situations and overcoming resentments.

(For details on how behavioral modeling works at Florida Steel, see box this page.)

An important part in selecting and training foremen at many companies is use of the skills assessment center. The concept was pioneered by Douglas Bray, an industrial psychologist in the human resources division of A. T. & T. in the post-World War II period.

Searching for a technique to measure how well applicants would actually do on the job, he recalled a system used by the British, German and American secret service agencies. To discover how skilled a prospective intelligence agent might be, he was given simulated "on-the-job" training.

For example, the prospect might be asked to assume a false identity and maintain it, though he faced a series of interrogators determined to break him down.

Dr. Bray adapted the principle in assessing potential first-line supervisors at A. T. & T., later expanding it to a wide variety of other managerial positions. It spread to other companies including Westinghouse, Union Carbide, and Caterpillar Tractor.

One of Dr. Bray's associates was William Byham, who introduced the concept in hundreds of companies when he established DDI as a consulting firm. The American Management Associations and others also provide similar services.

Asked by *Iron Age* how the assessment center technique works in selecting foremen, Dr. Byham says the essential difference is the larger number of candidates who must be tested.

"Unlike middle management jobs," he notes, "first-line supervising jobs provide for self-nomination. That means a larger number of candidates must be tested. But basically, the same assessment techniques are used for all levels of management. But in each case they are specifically tailored to the job actually involved."

One constant in skills assessment ever since it began has been the in-basket test. Candidates for a job are given a collection of memos, notes, letters, schedules and similar items and asked to take action on them, if they feel it's necessary.

In the case of candidates for foremen, an exercise in work scheduling is generally included since that task is one of the main responsibilities of the job.

Beyond the in-basket exercise, there are many challenges that can be given the prospective first-line supervisor.

One situation might involve an applicant being asked to be in two places at the same time. He must determine which is more important and why.

Another exercise finds the prospect being asked to juggle conflicting elements in a situation involving costs versus ethics. He's in charge of a factory line that faces a possible equipment breakdown just as his shift is nearing an end. Does he keep the line running and let the foreman on the next shift get stuck with the shutdown? Or does he shut down the line for repairs and adversely affect his operating costs?

Other situations can involve argument about overtime inequities among the workers that he must resolve. There could be an invitation to meet socially with the union—during his first day as foreman.

In this era of technological advance, is the foreman's role expanding or contracting?

What has been said before indicates clearly that it is expanding. But in which direction? Many of those questioned see the foreman moving higher into middle management.

Dr. Byham has pointed out that various studies have shown that the element most overlooked in installing an industrial robot was middle management. This has, naturally, led to hostility and resentment.

As the computer becomes more important on the shop floor, the foreman's interaction with staff personnel, with the office, with maintenance and technical personnel is bound to increase.

In such an atmosphere, the formerly "forgotten man"—the foreman—can no longer be ignored. He is going to have a lot to do with how well American industry operates in the 1980s and 1990s.

Wise managements will select him carefully, train him well, listen to his counsel with a receptive ear and make him, truly, management's representative on the shop floor. □

How Florida Steel Trains Foremen

Several years ago Florida Steel Corp. decided to train its first-line supervisors to deal with the problems they faced each day on the shop floor.

Most of these concerned employee performance and work habits, absenteeism, emotional situations and resentments.

Florida Steel decided to call in Pittsburgh-headquartered consultants Development Dimensions International (DDI) and make use of its interaction management training. Interaction management incorporates behavioral modeling techniques—techniques that make it possible for a supervisor (or any other manager) to handle discussions on behavior with a positive approach.

Ronald Metz, Florida Steel's human resource development manager, explains one segment of the training this way:

"The supervisors see a five or ten minute video tape of a foremen and a supervisor going through a session dealing with poor habits. The supervisor is shown handling the discussion in a positive way.

"That gives the supervisors viewing the tape a positive model as a guide. After this, they receive a detailed analysis of the set of critical steps used in the procedure. They learn the steps. Then, they skill practice the techniques they have been taught, in teams of two, switching roles each time they do. One plays the supervisor and the other plays the employee, and then the roles are reversed. With more practice, these skills are sharpened.

Developing the skills is one matter, Dr. Metz notes. Making sure they get used back on the job is another. Florida Steel and DDI ensured that any gaps would be bridged.

They not only trained the first-level supervisors. They filled in all the management levels above on what was taking place, all the way up to division managers. Mr. Metz keeps in touch with the division managers to make sure the techniques are used.

The initial program went in at Florida Steel's Jackson, Tenn., mill. Since then it has been put in place at all of the company's installations, including those at Charlotte, N.C. and Jacksonville, Tampa and Indiantown Fla.

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PLANT EQUIPMENT PRODUCTIVITY DOWN

It's down chiefly because a long-lagging economy has forced plants to operate below optimum levels.

BY JOHN D. BAXTER

How has labor productivity been doing in U.S. industry?

You know the answer—not too well.

More specifically, how has labor productivity been doing in manufacturing?

Again, not too well. Actually, it is running lower this yeer than last. And since 1977, labor productivity in manufacturing has moved up at a super-sluggish annual average rate of less than 1 pct (0.8 pct).

That's bad, of course. It's bad for the economy because it breeds inflationary pressures; labor cost hikes have far outrun productivity gains in recent years.

Low labor productivity is bad also because it undermines U.S. industry's competitiveness in world trade. High U.S. unit labor costs open the floodgates to imported manufactured products—and foreclose U.S. products from rich overseas markets.

Low labor productivity, and resulting high unit labor costs of U.S. manufactured products, thus act as a severe restraint on national economic growth. And anything that blocks economic growth, helps bring on high unemployment, monstrous government budget deficits and other national crises and problems.

So, you pass the test on labor productivity in manufacturing and on how that has been hurting the U.S. economy. It was an easy test. After all, labor productivity always has been a widely publicized subject in this country.

But, as any executive in any metalworking industry knows, there's a lot more to productivity than just labor productivity.

Most metalworking industries are capital intensive, not labor intensive. More and more operations in more plants are becoming machine-paced rather than man-paced.

So, what about capital productivity? Or, in another way of looking at it, what about the productivity of capital stock—the machinery and equipment used in manufacturing?

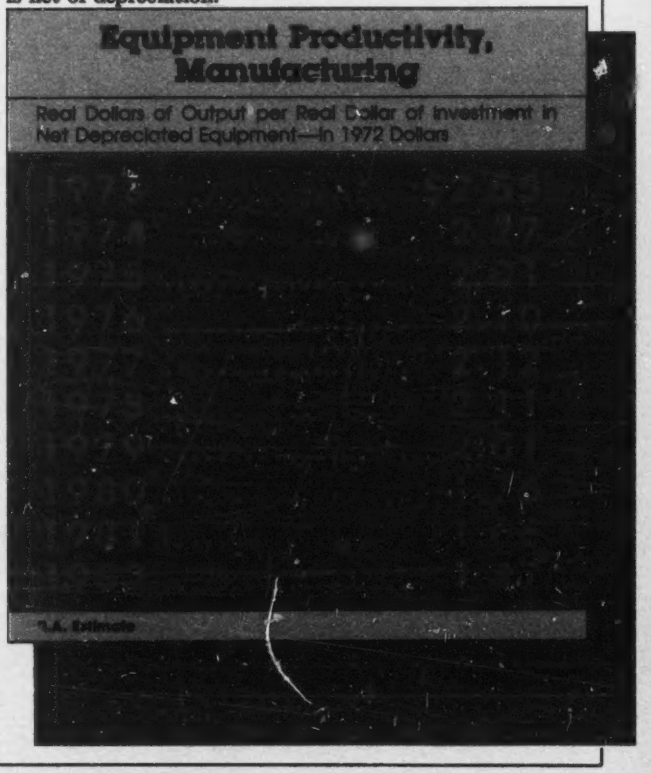
In a word, capital productivity, or equipment productivity, has been faring far worse than labor productivity in this country in recent years—and at the present time. And the 'bad effect' impact of poor equipment productivity on industry and the U.S. economy is just as great as poor labor productivity.

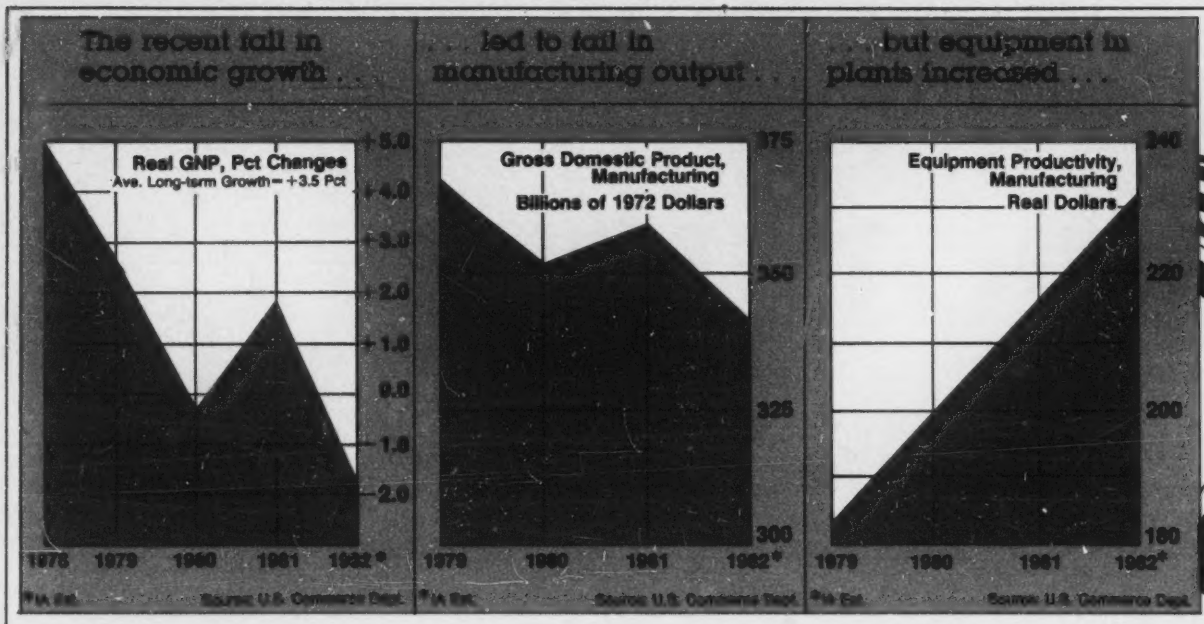
Equipment productivity is far less understood than labor productivity by most people, including some business executives. Too, unlike labor productivity, there are a number of ways to compute equipment productivity. So, before getting into the numbers on the recent performance of manufacturing equipment productivity, a word is needed on the methods behind the measure.

Productivity, in the context used here, refers to the number of dollars of revenue produced for each dollar invested in equipment. Strictly speaking, this is capital productivity. But when the capital referred to is all in manufacturing equipment, then the measure also serves as a good gage of equipment productivity. Investment in structures is excluded.

The input and the output of the productivity measures used here are those favored by several analysts in the U.S. Commerce Dept. The basic data, except for that of 1982 estimates, comes from that department.

Input is the dollar value of equipment used by manufacturers. This dollar value is after adjustment for inflation and is net of depreciation.





Output is the net revenue generated by manufacturing companies from domestic markets only. In official government data language, it is known as manufacturers' Gross Domestic Product. This factor is also inflation-adjusted.

The **productivity** reading from these input and output factors is the number of dollars of revenue collectively produced by U.S. manufacturing industries for each dollar invested in capital machinery and equipment.

(The box appearing with this article gives a more detailed description, and example, of the productivity ratios used here.)

Clearly, the productivity data cited here are not suitable for direct comparisons with company-level measures. As in the case of widely-published data on labor productivity, the figures on equipment are aggregate data and reflect a wide mix of all types of manufacturing industries.

Last year, each dollar's worth of capital equipment used in U.S. manufacturing produced an *Iron Age*—estimated $1.47 worth of output. That was down 11.5 pct from 1981's $1.66 worth of output per dollar value of equipment. Too, the 1982 ratio was 42 pct less than the ratio reached in 1973, the start of the decade.

Plant managers in metalworking know the havoc that can be wreaked in a shop due to machine downtime. Aside from disruptions caused by rescheduling, unit costs soar as shop productivity falls.

In a sense, what recent aggregate data on equipment is all about is economic downtime. Equipment productivity in U.S. manufacturing has fallen in recent years because a long-lagging economy has forced the equipment to be operated far below optimum levels.

A run-through of the four clustered charts here gives a clear picture of this economic downtime. The growth decline in real Gross National Product led directly to a fall in the output of manufacturers. As this output declined, the net stock of manufacturers' equipment rose. So, with more equipment producing less goods, productivity fell sharply.

A natural question raised at this point is: Why has net stock of equipment kept going up? After all, capital investment has been soft for years.

Equipment productivity in manufacturing has been a victim of economic downtime.

True, equipment spending has lagged lately. But it has lagged little in relation to output. For example, over the recent 25 years (1957-81), business real fixed investment as a percent of real GNP averaged 10.0 pct per year. In 1982, this figure was an estimated 10.7 pct, based on three quarters of actual data.

It is worth noting that the recent relatively high rates of investment as a percent of GNP are not reassuring to many plant investment analysts. Much of that net stock of equipment is known to be obsolete in light of recent advances in automated equipment.

Another reason for the continued growth of net stock of equipment is that once acquired, the equipment remains on hand for many years. There is a cumulative buildup of such stock, and when output falls off, this buildup phenomena worsens the effect on equipment productivity.

Also, recent economic growth has been more volatile than in the past. Equipment investment, a necessarily long-term commitment, often has been 'caught short' as negative growth years closely followed on the heels of solid growth years. This built up net stock of equipment in relation to output needs.

Cases in point: In the 1963-72 decade, **four** of the years had economic growth rates below the postwar annual average of 3.5 pct, and **one** of those years had negative growth. In the 1973-82 period, **six** of the years had growth below the long-term average, and **four** of the years were actually in the red. "That," as one economist has said, "is red-hot volatility."

So, data on capital productivity, or equipment productivity, may be of some interest in its own right. Certainly, it is not often seen; labor productivity dominates the subject area.

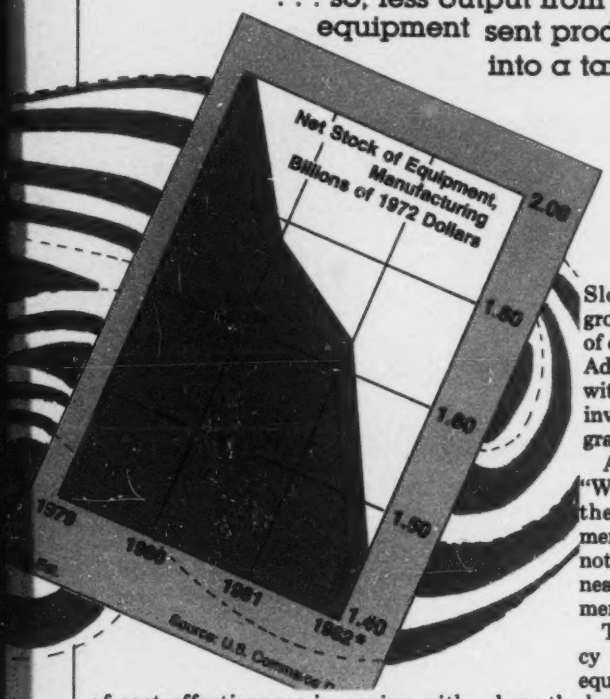
But how about the use of such data and measures?

There are productivity specialists, consultants and others who believe more attention must be given to this 'forgotten' area of productivity. They see the need for greater insights by both makers of national economic policies and by industry executives at the company level.

One important reason is the spiraling costs of credit and capital that have swept with hurricane force through the U.S.—and world—economic scene in recent years. It is not a short-term matter; new levels of costs have been reached.

High money costs call for new levels

. . . so, less output from more equipment sent productivity into a tailspin.



Slow and bumpy economic growth has made a shambles of equipment investment. The Administration has come up with the most liberal capital investment writeoff rules ever granted, but to no avail.

As one accountant notes, "When business is really bad, the after-tax cost of equipment, however low, is simply not a real incentive for business managers to buy equipment."

The more insight that policy makers have into capital equipment productivity, perhaps the better they can set policies to help it. So far, all policies designed to boost capital investment or productivity have been helpful only when business is moving ahead on its own right.

It may be beyond the reach of policy makers to provide what is most needed to boost capital investment or productivity—steady economic growth. But some experts see a place for more realistic policies that are designed to help when things aren't good.

of cost-effectiveness in coping with them. And that boils down to optimizing capital productivity. And where the capital flows into manufacturing equipment, there is an intensified need for increased equipment productivity. The high capital costs must be recouped. It can be done only through increased productivity.

At the national level, policy makers, in dealing with equipment productivity problems, have been frustrated lately.

The stress in Washington on labor productivity isn't likely to solve the equipment productivity problem, say some experts. This point was brought out by the General Accounting Office in 1980 when it recommended a plan be developed "for providing multi-factor measures for the major sectors of the economy."

At the business manager level, the figures on plant equipment productivity show him how efficiently overall U.S. manufacturing is operating.

The aggregate data reflects conditions in thousands of U.S. factories.

Some management consultants, with their overview of operations in many plants, contend that equipment productivity concern is given short shrift by many U.S. companies.

Says Peter F. Drucker, "Despite its importance and payoff, not many business managers pay much attention to the productivity of capital, let alone work systematically at raising it."

And capital productivity, as noted earlier, is what equipment productivity is all about.

Consultant Drucker and others report that many companies have more refined measures of labor productivity than they do for equipment, or capital, productivity. Capital/output ratio analysis is used fairly widely, they say, but it often has a broader base than production equipment. Yet, companies are becoming more capital intensive all the time.

Notes C. Jackson Grayson, chairman of the American Productivity Center, "Productivity measures based solely on labor input are of limited value in many industries, especially those which are capital intensive."

Some see an irony in continued emphasis by managers on labor productivity.

U.S. industry has undergone—and is undergoing—a great upheaval in the labor/capital equation. This is based chiefly on recent union give-backs, tougher managment labor negotiations and fast-growing use of highly automated equipment.

One consultant has noted that, "Direct labor may no longer be the area of opportunity for greatest productivity for U.S. companies."

In sum, it looks like non-labor productivity may soon take on a more important role both at the national policy-making level and in U.S. factories. The aggregate data certainly points to that need. □

How Productivity is Figured

There are several ways to calculate manufacturing equipment productivity, but the approach used here is one favored by some U.S. Commerce Dept. experts.

Input net constant dollar investment in equipment in use by U.S. manufacturing industries. This input comprises the investment value of manufacturers' equipment less depreciation and after allowing for inflation.

Output in the productivity ratio is gross domestic product of manufacturers. In other words, output comprises the gross revenues generated in this country by U.S. manufacturers. It is their total domestic value added. These revenues are inflation-adjusted also.

It all adds up that what is being measured is the inflation-adjusted market value of domestic output of manufacturers produced by each dollar's worth of equipment—that equipment value being less depreciation and adjusted for inflation.

For example, U.S. manufacturers in 1982 had an estimated gross domestic output of $341 billion. They achieved that output by using capital machinery and equipment valued at $233 billion. That meant that each dollar of equipment accounted for $1.47 worth of output.

Now, look at the chart on plant equipment productivity. Compare the $1.47 produced by each dollar's worth of equipment in 1982 with the $2.55 produced in 1973. This shows that productivity of equipment used in U.S. manufacturing was down a very steep 42 pct between 1973 and 1982.

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Recession Blunts Japan's Growth

Japanese machine tool companies have been hit hard by the recession—especially in the latter half of 1982.

While machine tool production in Japan for the first 8 months was only down 2.3 pct for a value of $2.2 billion, orders were far more discouraging. In the first nine months of 1982, orders were down 12.5 pct in value.

Even numerically controlled machine tools felt the economic crunch. Production of NC machines was down just 1 pct from 1981; in fact, the value of the 16,698 units produced in the first 8 months of 1982 was 2.3 pct above the value of those NC machines produced in the similar period of 1981.

But, again, orders told a different story. The first nine months saw NC machine tool orders down 8 pct from the comparable '81 period.

Export orders were also down 25 pct.

The trend in orders suggests that the bottom of the trough may not have been reached yet. In any case, little growth can be expected in the next six months, and the value of orders, already well below the value of production could fall further before an improvement is seen.

Over the past few years, machine tool production in Japan has increased rapidly, especially in NC machines. Despite the current downturn, which is worldwide, Japan is still very much a world competitor.

As the "newly industrialized nations" such as South Korea, Taiwan and Singapore, begin to take some market share at the low end of the spectrum, Japanese companies are responding by adding more value to their machines, as the spate of FMS on display at Osaka demonstrated.

For example, in 1981 the value of production of machine tools amounted to $3.8 billion, up 24.8 pct from 1980. NC machine tool sales increased by 27.9 pct in 1981 over 1980 to a value of $1.9 billion.

However, the actual number of NC machines produced increased by just 17.6 pct, indicating that the value of each machine is being increased.

Exports from Japan rose in 1981 over 1980 by 15 pct to $1.4 billion, with numerically controlled machine tools accounting for $895 million, almost 70 pct of exports.

The biggest buyer of Japanese machine tools by far has been the U.S.A. which took 51 pct of the export total in 1981. Europe bought 20 pct, and the Eastern Bloc countries, 7 pct.

Meanwhile imports of machine tools to Japan in 1981 were worth only $157.9 million, up just 1 pct from the previous year. Generally, Japanese companies buy high-technology machines overseas, with 31 pct coming from West Germany, 24 pct from Switzerland and 20 pct from the U.S.A.

Japanese Machine Tool Industry

Producton and Orders, Millions of Dollars

1981	
Total sales	**3887.5**
NC machines	1968.2
Including:	
NC lathes	731.3
Machining centers	749.8
Milling machines	119.3
Total exports	**1409.1**
Including:	
NC Lathes	507.7
Machining centers	431.2
NC milling machines	40.2
1982 (first 8 months)	
Total production	**2200.2**
Lathes	149.8
Milling machines	119.7
NC machines	1194.2
Total orders	**1672.8**
Including:	
NC machines	926.2
Exports	374.9

(Cont. from p. 57)

pallet holders on a rotary table.

Niigata is about to install its FMS to machine parts for machine tools. The company developed this system from one built to produce cylinder heads for Niigata's big diesel engines. This system is designed for large workpieces, and is based on one HN80A and one HN50A machining center.

The automatic workpiece loading/unloading system is specifically designed for free disposal of swarf. A significant feature of this system is a loop-type optical fiber data highway which can serve up to 15 units, including CNC machines, terminals and trolleys.

One minicomputer can control four loops, thus providing the base for a completely computerized manufacturing system. Since a CNC machine can be plugged into the loop via an interface unit, without the need for parallel cables running to the minicomputer, the system can be expanded easily.

Clearly, that is the data highway most suitable for FMS, and points one way ahead.

Robot arms are also becoming essential features of machine tools, so it was not surprising that companies such as Yamasaki, Okuma, Ikegai and Hitachi Seiki have developed arms that can be fitted to their machines.

Daikin Industries was one of the independent companies showing a robot arm that can be mounted on the front of a machine. The arm articulates on a horizontal spindle, and can also move longitudinally in its housing. Then, the wrist can rotate.

Toyama introduced its cylindrical coordinate robot for parts handling at machine tools. The Toyama RP-1 has a capacity of 110 lb, including the hand, and has up to six degrees of freedom.

Aida Engineering also showed its new A-1 electro-hydraulic robot, designed principally for handling at presses. Fanuc, too, was showing its new S-Model robots, which have jointed arms. There are models with gripper capacities of 22, 44 and 66 lb in the range, but these are intended for arc welding, spraying and laying sealant, not for use in machine shops.

Machine monitoring was also spotlighted at the Osaka Show. Hitachi Seiki's version of the all-important machine monitor system differs from most others in that it measures the current needed to provide the necessary thrust at the tool to cut metal, not the current at the main spindle. If the current increases 20 pct above normal, the feed rate is reduced, and if the current is still too high, then a new tool is fitted.

In evidence at the Fanuc, Yaskawa and Mitsubishi Electric stands were ac servo motors. Although these motor types require complex electronic circuitry, they are much lighter than dc servo motors of the same output, and as they are brushless, maintenance costs are low. These can be expected to come into use much more widely in the future.

There were other signposts at Osaka, apart from the big one to FMS. CNC has made profile millers redundant for die making. Mitsui Seiki was one of the companies showing a CAD/CAM system for use with a CNC machining center to produce dies quickly.

In addition, CAD/CAM is rapidly reaching the stage where the engineer will be able to control complete design and machining operations. □

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EFFECTIVE JANUARY 10, 1983

MATERIALS NEWSFRONT

Price & Production Data

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age will publish only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit.
Prices for other weeks will continue to be available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter. (For details on these services see ad on pg. 65.)

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective January 10, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,136	898	1,264	2,004
Capability Utilization Rate	39.2	30.4	38.2	59.5

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 60.17	$ 57.50	$ 52.17	$ 75.50
No. 2 bundles	$ 41.83	$ 40.83	$ 38.50	$ 54.17
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 62.50	$ 62.50	$ 52.50	$ 85.50
No. 1 steel, Philadelphia	56.50	54.50	54.50	66.50
No. 1 steel, Chicago	61.50	55.50	49.50	74.50
No. 1 bundles, Detroit	48.50	48.50	41.50	74.50
Low Phos., Youngstown	64.50	51.50	51.50	85.50
No. 1 mach'y cast., Pgh	61.50	61.50	61.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	111.50
No. 1 mach'y cast., Chi	104.50	104.50	104.50	120.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective January 10, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	76.00-77.50	75.00-76.50	1/10/83
Lead	22.00-23.00	21.50-23.00	1/7/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00-40.00	36.00-40.00	1/3/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.25-$1.40
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $474.00
Indium, dollars per troy oz..... $2.60-$2.85
Iridium, dollars per troy oz..... $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$360-$375
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85

Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz..... $12.05
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Jan. 3—573.59
Jan. 4—575.44
Jan. 5—576.36
Jan. 6—576.89
Jan. 7—577.82

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	69½	60¼
Yellow brass	60⅛	53⅛
Red brass	64⅜	55⅛
Comm. bronze	65⅝	56½
Mang. bronze	59¼	57½
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	63
No. 2 copper wire	56
Light copper	47

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	59
No. 2 copper wire	52
Light copper	43
No. 1 composition	51
No. 1 comp. turnings	48
Hvy. yellow brass solids	34
Hvy. yellow brass turnings	26
Radiators	42

Aluminum

New mixed clips	25	—26
Old sheet	24	—25
Old cast	24	—25
Clean dry borings	24	—25

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	22	—23
Mixed L.C. clips	20	—21
Old sheets and cast	14	—15
Borings and turnings	10	—11
Duraluminum clippings	20	—21

Copper and Brass

No. 1 copper wire	48	—49
No. 2 copper wire	41	—42
Light copper	35	—36
Radiators	34	—35
No. 1 composition	42	—43
No. 1 composition turn'gs	40	—41
Cocks and faucets	29	—30
Clean heavy yellow brass	27	—28
Brass Pipe	29	—30
New soft brass clippings	35	—36

Lead

Heavy soft lead	9	—10
Whole batteries	4	— 5
Type metal	14	—15
Electrotype	18	—19

Nickel

Nickel solids	85	— 90
Nickel rod ends	85	— 90
Nickel sheets, clips	85	— 90
Nickel turnings	40	— 45

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

EFFECTIVE JANUARY 10, 1983

MATERIALS NEWSFRONT

(Effective January 10, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 62.00 to	$ 63.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	72.00 to	73.00
No. 1 factory bundles (auto)	68.00 to	69.00
No. 2 bundles	41.00 to	42.00
No. 1 busheling	69.00 to	70.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	74.00 to	75.00
Heavy turnings	50.00 to	51.00
No. 1 RR hvy. melting	71.00 to	72.00
Rails 2 ft. and under	81.00 to	82.00
Scrap rails, random lgth.	76.00 to	77.00
RR specialties	75.00 to	76.00
No. 1 machinery cast	61.00 to	62.00
Cupola cast	54.00 to	55.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	440.00 to	450.00
18-8 turnings	340.00 to	350.00

Chicago

No. 1 hvy. melting	$ 61.00 to	$ 62.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 dealer bundles	70.00 to	71.00
No. 1 factory bundles (auto)	70.00 to	71.00
No. 2 dealer bundles	44.00 to	45.00
No. 1 busheling	66.00 to	67.00
Shredder scrap	66.00 to	67.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	33.00 to	34.00
Low phos. forge crop	79.00 to	80.00
Low phos. punchings plate 1/4 in. and heavier	84.00 to	85.00
Low phos. 2 ft. and under	79.00 to	80.00
No. 1 RR hvy. melting	63.00 to	64.00
Scrap rails, random lgth.	62.00 to	63.00
Reroller rails	90.00 to	91.00
Rails, 2 ft. and under	82.00 to	83.00
RR couplers and knuckles	69.00 to	70.00
RR car axles	99.00 to	100.00
No. 1 machinery cast	104.00 to	105.00
Cupola cast	90.00 to	91.00
Stove plate	78.00 to	79.00
Steel car wheels	69.00 to	70.00
Stainless		
18-8 bundles and solids	380.00 to	390.00
18-8 turnings	280.00 to	290.00
430 bundles and solids	90.00 to	95.00
430 turnings	65.00 to	70.00

Philadelphia

No. 1 hvy. melting	$ 55.00 to	$ 58.00
No. 2 hvy. melting	49.00 to	52.00
No. 1 dealer bundles	70.00 to	73.00
No. 2 dealer bundles	38.00 to	41.00
No. 1 busheling	70.00 to	73.00
Shredder scrap	67.00 to	70.00
Machine shop turn.	18.00 to	21.00
Mixed bor. and turn.	18.00 to	21.00
Shoveling turnings	33.00 to	36.00
Clean cast chemical borings	40.00 to	43.00
Low phos. 5 ft. and under	67.00 to	70.00
Low phos. 2 ft. punchings	85.00 to	88.00
Electric furnace bundles	79.00 to	82.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	89.00 to	92.00
Cupola cast	56.00 to	59.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 41.00 to	$ 42.00
No. 2 hvy. melting	39.00 to	40.00
No. 1 dealer bundles	48.00 to	49.00
No. 2 bundles	20.00 to	21.00
No. 1 busheling	47.00 to	48.00
Drop forge flashings	25.00 to	26.00
Machine shop turn.	15.00 to	16.00
Mixed borings and turn.	6.00 to	7.00
Shoveling turnings	15.00 to	16.00
Cast iron borings	5.00 to	6.00
Heavy breakable cast	24.00 to	25.00
Mixed cupola cast	40.00 to	41.00
Automobile cast	60.00 to	61.00
Stainless		
18-8 bundles and solids	315.00 to	325.00
18-8 turnings	215.00 to	225.00
430 bundles and solids	75.00 to	85.00

Youngstown

No. 1 hvy. melting	$ 59.00 to	$ 60.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	64.00 to	65.00
Electric furnace bundles	65.00 to	66.00
Galvanized bundles	59.00 to	60.00

Cleveland

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	24.00 to	25.00
No. 1 dealer bundles	55.00 to	56.00
No. 1 factory bundles	61.00 to	62.00
No. 2 bundles	22.00 to	23.00
No. 1 busheling	58.00 to	59.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	84.00 to	85.00
Low phos. punchings plate	84.00 to	85.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	89.00 to	90.00
Rails, 18 in. and under	90.00 to	91.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	79.00 to	80.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	275.00 to	285.00
18-8 turnings	225.00 to	235.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 25.00 to	$ 26.00
No. 2 hvy. melting	15.00 to	16.00
No. 1 busheling	30.00 to	31.00
No. 1 dealer bundles	28.00 to	29.00
No. 2 bundles	12.00 to	13.00
Machine shop turn.	1.00 to	2.00
Mixed bor. and turn.	8.00 to	9.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Low phos. plate	48.00 to	49.00
Structural and plate, 2 ft. and under	46.00 to	47.00
Rails, 2 ft. and under	42.00 to	43.00
Scrap rails, random lgth.	22.00 to	23.00
No. 1 machinery cast	63.00 to	64.00
No. 1 cupola cast	42.00 to	43.00

St. Louis

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	44.00 to	45.00
Foundry steel, 2 ft.	44.00 to	45.00
No. 1 dealer bundles	52.00 to	53.00
No. 2 bundles	41.00 to	42.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	52.00 to	53.00
Rails, random length	49.00 to	50.00
Rails, 18 in. and under	64.00 to	65.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 54.00 to	$ 55.00
No. 2 heavy melting	52.00 to	53.00
No. 1 dealer bundles	54.00 to	55.00
No. 2 bundles	40.00 to	41.00
No. 1 busheling	52.00 to	53.00
Shredder scrap	69.00 to	70.00
Machine shop. turn.	18.00 to	19.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	53.00 to	54.00
Elec. furnace, 3 ft. & under	50.00 to	51.00
Structural and plate, 2 ft.	70.00 to	71.00
Structural and plate, 4 ft.	66.00 to	67.00
No. 1 RR hvy. melting	54.00 to	55.00
Scrap rails, random lgth.	52.00 to	53.00
Rails, 18 in. and under	73.00 to	74.00
Angles and splice bars	65.00 to	66.00
No. 1 cupola cast	74.00 to	75.00
Unstripped motor blocks	52.00 to	53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	32.00 to	33.00
No. 1 dealer bundles	34.00 to	35.00
No. 2 bundles	21.00 to	22.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	3.00 to	4.00
Cast iron borings	4.00 to	5.00
Low phos. 18 in. and under	58.00 to	59.00
Rails, random length	40.00 to	41.00
Rails, 2 ft. and under	65.00 to	66.00
No. 1 cupola cast	50.00 to	51.00
Heavy breakable cast	20.00 to	21.00
Drop broken cast	62.00 to	63.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 26.00 to	$ 27.00
No. 2 hvy. melting	22.00 to	24.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	360.00 to	385.00
18-8 turnings	255.00 to	275.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to	$ 30.00
No. 2 hvy. melting	20.00 to	22.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 bundles	16.00 to	18.00
No. 1 busheling	28.00 to	30.00
Shredder scrap	38.00 to	40.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	1.00 to	2.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	23.00 to	25.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	27.00 to	29.00
No. 1 dealer bundles	25.00 to	27.00
No. 2 dealer bundles	8.00 to	10.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 53.00 to	$ 55.00
No. 2 hvy. melting	42.00 to	44.00
No. 2 bundles	32.00 to	34.00
No. 1 cupola cast	88.00 to	90.00
Mixed yard cast	78.00 to	80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 33.00
No. 2 heavy melting cut 2 ft. and under	30.00
No. 1 dealer bundles	40.00
No. 2 bundles	5.00
Mixed steel scrap	17.00
Bush. new fact. prep'd.	38.00
Bush. new fact. unprp'd.	30.00
Machine shop turn.	18.00
Short steel turn.	21.00
Mixed bor. and turn.	10.00
Cast scrap	30.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	40.00 to	41.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	12.00 to	13.00
Crushed turnings	24.00 to	26.00
Shredder scrap	52.00 to	53.00
Cut structural plate 2 ft. and under	74.00 to	76.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	65.00

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FEBRUARY 7, 1983

IRON AGE

THE MAGAZINE FOR METAL PRODUCING MANAGEMENT

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CONTINUOUS CASTING:

WHY MORE COMPANIES ARE MAKING A COMMITMENT

BERYLLIUM COPPER STRIP:
ROLLING IT WIDE AT CABOT BERYLCO

VOL. 226, NO. 4

IRON AGE

FEBRUARY 7, 1983

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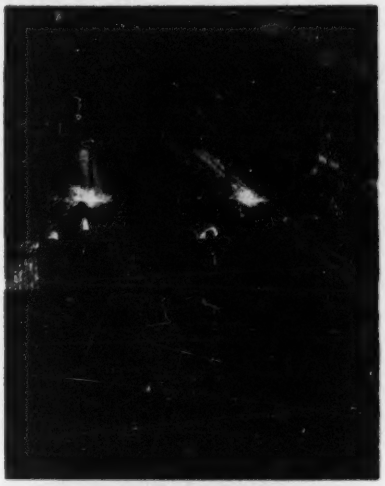

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Steel's labor showdown

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EFFECTIVE JANUARY 24, 1983

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	158	144	101	203
Buffalo	30	33	29	31
Pittsburgh	158	166	49	266
Youngstown	82	66	40	92
Cleveland	89	69	44	116
Detroit	116	113	106	102
Chicago	381	373	342	466
Cincinnati	65	65	53	70
St. Louis	54	54	26	32
Southern	110	100	53	203
Western	70	69	55	98
U.S. Production	1,313	1,252	898	1,679

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**85.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective January 24, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,313	1,252	3,829	5,346
Capability Utilization Rate	45.3	43.2	42.0	57.8

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/6/83)	25.954	25.297	25.297	25.195
Pig Iron* * (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton = 2240 lbs.)	$ 61.50	$ 60.50	$ 57.50	$ 83.83
No. 2 bundles	$ 42.50	$ 41.83	$ 40.83	$ 57.83
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh .	$ 62.50	$ 62.50	$ 62.50	$ 94.50
No. 1 steel, Philadelphia	59.50	56.50	54.50	74.50
No. 1 steel, Chicago.....	62.50	62.50	55.50	82.50
No. 1 bundles, Detroit..	48.50	48.50	48.50	77.50
Low Phos., Youngstown	64.50	64.50	51.50	85.50
No. 1 mach'y cast., Pgh	61.50	61.50	61.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	111.50
No. 1 mach'y cast., Chi	106.50	106.50	104.50	124.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective January 24, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	77.00-78.00	78.00-80.00	1/20/83
Lead	21.00-24.00	22.00-24.00	1/19/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	1/11/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% plg. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.25-$1.40
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $476.00
Indium, dollars per troy oz. ..... $2.60-$2.85
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. .. $360-$380
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $12.30
Vanadium $4.94
Zirconium sponge ..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Jan. 17—582.44 Jan. 20—581.65
Jan. 18—581.92 Jan. 21—580.59
Jan. 19—581.25

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	72½	63¼
Yellow brass	62⅛	55⅝
Red brass	66⅞	58⅛
Comm. bronze	68⅛	59½
Mang. bronze	60⅝	59¼
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	64
No. 2 copper wire	56
Light copper	47

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	60
No. 2 copper wire	52
Light copper	43
No. 1 composition	50
No. 1 comp. turnings	47
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	25
Radiators	41

Aluminum

New mixed clips	27	—28
Old sheet	25	—26
Old cast	25	—26
Clean dry borings	26	—27

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	23	—24
Mixed L.C. clips	21	—22
Old sheets and cast	15	—16
Borings and turnings	11	—12
Duraluminum clippings	20	—21

Copper and Brass

No. 1 copper wire	49	—50
No. 2 copper wire	42	—43
Light copper	36	—37
Radiators	34	—35
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	26	—27
Brass Pipe	28	—29
New soft brass clippings	35	—36

Lead

Heavy soft lead	9	—10
Whole batteries	4	— 5
Type metal	14	—15
Electrotype	18	—19

Nickel

Nickel solids	85	— 90
Nickel rod ends	85	— 90
Nickel sheets, clips	85	— 90
Nickel turnings	40	— 45

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

EFFECTIVE JANUARY 24, 1983

MATERIALS NEWSFRONT

(Effective January 24, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 62.00 to	$ 63.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	72.00 to	73.00
No. 1 factory bundles (auto)	68.00 to	69.00
No. 2 bundles	41.00 to	42.00
No. 1 busheling	69.00 to	70.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	74.00 to	75.00
Heavy turnings	50.00 to	51.00
No. 1 RR hvy. melting	76.00 to	77.00
Rails 2 ft. and under	85.00 to	86.00
Scrap rails, random lgth.	80.50 to	81.50
RR specialties	78.00 to	79.00
No. 1 machinery cast	61.00 to	62.00
Cupola cast	54.00 to	55.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	440.00 to	450.00
18-8 turnings	340.00 to	350.00

Chicago

No. 1 hvy. melting	$ 62.00 to	$ 63.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	71.00 to	72.00
No. 1 factory bundles (auto)	71.00 to	72.00
No. 2 dealer bundles	44.00 to	45.00
No. 1 busheling	70.00 to	71.00
Shredder scrap	70.00 to	71.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	33.00 to	34.00
Low phos. forge crop	80.00 to	81.00
Low phos. punchings plate ⅛ in. and heavier	85.00 to	86.00
Low phos. 2 ft. and under	80.00 to	81.00
No. 1 RR hvy. melting	83.00 to	84.00
Scrap rails, random lgth.	83.00 to	84.00
Reroller rails	91.00 to	92.00
Rails, 2 ft. and under	83.00 to	84.00
RR couplers and knuckles	70.00 to	71.00
RR car axles	99.00 to	100.00
No. 1 marhinery cast	106.00 to	107.00
Cupola cast	91.00 to	92.00
Stove plate	80.00 to	81.00
Steel car wheels	71.00 to	72.00
Stainless		
18-8 bundles and solids	410.00 to	420.00
18-8 turnings	310.00 to	320.00
430 bundles and solids	90.00 to	95.00
430 turnings	65.00 to	70.00

Philadelphia

No. 1 hvy. melting	$ 58.00 to	$ 61.00
No. 2 hvy. melting	50.00 to	53.00
No. 1 dealer bundles	70.00 to	73.00
No. 2 dealer bundles	40.00 to	43.00
No. 1 busheling	70.00 to	73.00
Shredder scrap	70.00 to	73.00
Machine shop turn.	19.00 to	22.00
Mixed bor. and turn.	19.00 to	22.00
Shoveling turnings	33.00 to	36.00
Clean cast chemical borings	40.00 to	43.00
Low phos. 5 ft. and under	69.00 to	72.00
Low phos. 2 ft. punchings	85.00 to	88.00
Electric furnace bundles	79.00 to	82.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	89.00 to	92.00
Cupola cast	56.00 to	59.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 41.00 to	$ 42.00
No. 2 hvy. melting	39.00 to	40.00
No. 1 dealer bundles	48.00 to	49.00
No. 2 bundles	20.00 to	21.00
No. 1 busheling	47.00 to	48.00
Drop forge flashings	25.00 to	26.00
Machine shop turn.	15.00 to	16.00
Mixed borings and turn.	6.00 to	7.00
Shoveling turnings	15.00 to	16.00
Cast iron borings	5.00 to	6.00
Heavy breakable cast	24.00 to	25.00
Mixed cupola cast	40.00 to	41.00
Automobile cast	60.00 to	61.00
Stainless		
18-8 bundles and solids	315.00 to	325.00
18-8 turnings	215.00 to	225.00
430 bundles and solids	75.00 to	85.00

Youngstown

No. 1 hvy. melting	$ 59.00 to	$ 60.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	64.00 to	65.00
Electric furnace bundles	65.00 to	66.00
Galvanized bundles	59.00 to	60.00

Cleveland

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	24.00 to	25.00
No. 1 dealer bundles	55.00 to	56.00
No. 1 factory bundles	61.00 to	62.00
No. 2 bundles	22.00 to	23.00
No. 1 busheling	58.00 to	59.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	84.00 to	85.00
Low phos. punchings plate	84.00 to	85.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	89.00 to	90.00
Rails, 18 in. and under	90.00 to	91.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	79.00 to	80.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	275.00 to	285.00
18-8 turnings	225.00 to	235.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 25.00 to	$ 26.00
No. 2 hvy. melting	15.00 to	16.00
No. 1 busheling	30.00 to	31.00
No. 1 dealer bundles	28.00 to	29.00
No. 2 bundles	12.00 to	13.00
Machine shop turn.	1.00 to	2.00
Mixed bor. and turn.	8.00 to	9.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Low phos. plate	48.00 to	49.00
Structural and plate, 2 ft. and under	46.00 to	47.00
Rails, 2 ft. and under	42.00 to	43.00
Scrap rails, random lgth.	22.00 to	23.00
No. 1 machinery cast	63.00 to	64.00
No. 1 cupola cast	42.00 to	43.00

St. Louis

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	44.00 to	45.00
Foundry steel, 2 ft.	44.00 to	45.00
No. 1 dealer bundles	52.00 to	53.00
No. 2 bundles	41.00 to	42.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	52.00 to	53.00
Rails, random length	49.00 to	50.00
Rails, 18 in. and under	64.00 to	65.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 54.00 to	$ 55.00
No. 2 heavy melting	52.00 to	53.00
No. 1 dealer bundles	54.00 to	55.00
No. 2 bundles	40.00 to	41.00
No. 1 busheling	52.00 to	53.00
Shredder scrap	69.00 to	70.00
Machine shop. turn.	18.00 to	19.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	53.00 to	54.00
Elec. furnace, 3 ft. & under	50.00 to	51.00
Structural and plate, 2 ft.	70.00 to	71.00
Structural and plate, 4 ft.	66.00 to	67.00
No. 1 RR hvy. melting	54.00 to	55.00
Scrap rails, random lgth.	52.00 to	53.00
Rails, 18 in. and under	73.00 to	74.00
Angles and splice bars	65.00 to	66.00
No. 1 cupola cast	74.00 to	75.00
Unstripped motor blocks	52.00 to	53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 39.00
No. 2 hvy. melting	37.00 to	38.00
No. 1 dealer bundles	39.00 to	40.00
No. 2 bundles	26.00 to	27.00
Machine shop turn.	3.00 to	4.00
Shoveling turnings	6.00 to	8.00
Cast iron borings	8.00 to	9.00
Low phos. 18 in. and under	63.00 to	64.00
Rails, random length	45.00 to	46.00
Rails, 2 ft. and under	70.00 to	71.00
No. 1 cupola cast	55.00 to	56.00
Heavy breakable cast	22.00 to	23.00
Drop broken cast	62.00 to	63.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 26.00 to	$ 27.00
No. 2 hvy. melting	22.00 to	24.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	375.00 to	400.00
18-8 turnings	260.00 to	280.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 28.00 to	$ 30.00
No. 2 hvy. melting	20.00 to	22.00
No. 1 dealer bundles	30.00 to	32.00
No. 2 bundles	16.00 to	18.00
No. 1 busheling	30.00 to	32.00
Shredder scrap	38.00 to	40.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	1.00 to	2.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	23.00 to	25.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	27.00 to	29.00
No. 1 dealer bundles	25.00 to	27.00
No. 2 dealer bundles	8.00 to	10.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 53.00 to	$ 55.00
No. 2 hvy. melting	42.00 to	44.00
No. 2 bundles	32.00 to	34.00
No. 1 cupola cast	88.00 to	90.00
Mixed yard cast	78.00 to	80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 33.00
No. 2 heavy melting cut 2 ft. and under	30.00
No. 1 dealer bundles	40.00
No. 2 bundles	5.00
Mixed steel scrap	17.00
Bush. new fact. prep'd.	38.00
Bush. new fact. unprp'd.	30.00
Machine shop turn.	18.00
Short steel turn.	21.00
Mixed bor. and turn.	10.00
Cast scrap	30.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	40.00 to	41.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	12.00 to	13.00
Crushed turnings	24.00 to	26.00
Shredder scrap	52.00 to	53.00
Cut structural plate 2 ft. and under	74.00 to	76.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	66.00

STEEL PRICES

Codes identify Producers listed in the Key on page 50. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A.—Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10	$420.00
R3	$420.00
Midwest	
R3, U1, W5	$420.00
S1	$420.00
C10	$420.00
K2	$400.00
W5	$400.00
West	
B3(2)	$430.00
C6	$420.00
South	
A7	$420.00
Alloy, East	
R3, C10	$459.00
B3	$459.00
Midwest	
W6, W5, C10	$459.00
S1, U1	$459.00
R3	$459.00
West	
B3	$469.00
C6	$469.00
South	
A7	$459.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7	24.15
C20	22.90
W8	22.90
I3, T10, U1, N4	23.90
West	
C6	25.10
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	23.90
W8	24.15
U1	23.90
I3	23.90
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	23.90
I3	23.90
West	
U1	24.40
C6	24.15
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut ll Edge—all widths, East	
B3, U1	20.80
J3	20.80
Midwest	
A7, D1	20.80
I4	20.20
S1, J3, D1	20.80
W3	20.80
N4	22.55
W5	20.80
U1	20.80
B3, G2, I3, M2, R3, J3, G3	20.80
West	
K1	20.80
B3	24.70
South	
R3	20.80
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
R7, S10, B4	29.60
P15	24.80
S7	Cmp*
U1	33.25
D1(1)	Cmp*
B4	31.55
Midwest	
G4	24.80
I4	30.15
W14	22.95
S1, U1, J4	32.00
T4	Cmp*

*Composite pricing

West	
U1	33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, East (plus extras)*	
Midwest	
M2, G3, R3, W3, I4, J3, G2, I3	20.80
A7	20.80
S1	20.80
West	
K1	20.80
South	
R3	20.80
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	23.20
G4	25.80
I4	22.70
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	42.60
P15	32.10
S1	39.90
Midwest	
I4	39.40
S1	37.65

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	20.80
J3	20.80
U1	20.80
Midwest	
A7, U1, B3, G2, G3, I3, M2, R3, W3	20.80
S1, W5, D1	20.80
J3	20.80
I4	19.90†
West	
U1	21.30
K1	20.80
South	
R3	20.80
Cold-Rolled, East, Class I	
B3(2), U1	24.65
J3	24.65
Midwest	
B3, I3, G3, R3, M2, U1(2)	24.65
G2, W3, M11	24.65
I4	22.00
J3, A7	24.65
S1, W5, D1	24.65
West	
U1	25.15
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	26.25
Midwest	
J3, D1	26.25
I3, W5, S1	26.25
U1, A7, R3, Y1	26.25
G2, W3, M11	26.25
West	
K1	27.15
South	
U1	26.25
R3	26.25
Enameling, Midwest	
A7, I3, U1, J3	26.15
S1	26.50
Long-Terne, Midwest	
W5	28.30
A7, U1	27.60
R3	27.60

†Actual weight basis

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
B3	23.25
South	
G7	22.35

Tinplate

Electrolytic Tinplate

	per base box
Single Reduced (70 lb)	
East	
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3 (75 lb)	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$25.44
U1	26.79
South	
U1	$26.29
Double Reduced (55 lb)**	
Midwest	
M11 (50 lb)	$21.49
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$20.39
U1	21.99
South	
U1	$21.49
Black Plate	
Single Reduced (75 lb)*	
East	
B3	$23.36
Midwest	
J3	$23.36
M11	24.01
I3, U1, W5	23.36
W3	24.01
West	
K1	$24.01
U1	23.36
Double Reduced (55 lb)	
East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

*70 lb—base weight extra 45¢
**50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled
(Special quality)

East	
R3, K3	23.95
R5	23.95
B3(3), J3	23.95
U1, C10	23.95
Midwest	
A7, C20, N4	23.95
U1, I3, I4	23.95
R3, T10	23.95
K2	23.95
I3	19.50*
West	
B3	23.95
C6	24.45
U1	23.95
B3	24.70
South	
A8	20.65
A7	23.95
C16	23.95
Cold-Finished Carbon, East	
A11	22.15
J3(2)	31.50
R3	31.50
C21	21.15
J3, L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	31.00
M1	23.025
B4, C10	31.00
J3	31.50
Midwest	
B5, W10, Y1, W8, R3	31.00
J3	32.15
B1	19.80
L2	30.75
N9	31.00
P3	19.85+CMS
W14	22.20
J3(3)	31.00
B5	31.25
J3	32.15
West	
B5	31.20
B5	34.90
R3	31.20-34.90
South	
B5	32.85
J3	31.95
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10	26.10
R3	26.10
J3	26.10
Midwest	
A7, U1, R3	26.10
I3, C10	26.10
I4	24.85
I3	21.00*
West	
B3, U1	26.10
B5	18.50
C6	26.60
B3	27.10
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	35.40
M1	28.025
R4	25.65
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	35.40
Midwest	
B5, R3, C10	34.85
C2	28.275
J3, M9, W10	35.40
P3	22.75
B1	22.70
N9	34.85
L2	34.65
B5	35.10
J3	36.00
J3	34.85
West	
R3	35.20-38.25
B5	35.20
B5	38.25
South	
J3	35.40
C16	28.00
B5	36.75

Plates

Carbon Steel, East	
B3(2)	24.25
L4	24.25
P2	24.25
U1	24.25
J3	25.25
Midwest	
B3, R3, S1	24.25
I3	24.25
J3, A7	21.70
U1, I4	24.25
West	
A7, B3, C6, O2	24.25
K1	23.50
U1	24.25
South	
R3	24.25
A7	25.25
U1	24.25
Alloy, East	
B3, J3	32.05
U1, L4	32.05
P2	32.05
Midwest	
B3	32.05
Q2, G3	32.05
I4, U1	33.05
West	
B3	32.05
O2	30.55
K1	31.30
South	
A7	27.55

Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
U1	27.70
A7, R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
A7	25.95
C6	24.95

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C8 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Corp., Detroit
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., [illegible]

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker-Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities* / City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	25.04	29.02	31.47	33.74	28.64	31.07	20.27	36.38	42.10	52.60	69.58	73.19
Baltimore	32.25	24.49	32.76	34.74	28.83	31.13	22.17	36.44	55.85	59.91	67.79	76.32
Birmingham	25.90	30.24	36.47	35.03	29.67	31.68	21.36	42.09	49.31	50.41	68.16	74.43
Boston	23.43	28.25	31.93	44.27	37.43	37.68	21.80	47.75	57.60	60.66	68.49	75.74
Buffalo	27.75	34.41	36.35	43.01	35.20	32.46	18.26	45.85	54.11	55.64	62.09	70.72
Chicago	20.66	27.56	29.92	28.38	27.89	27.59	15.85	36.51	36.36	45.80	49.72	56.53
Cincinnati	21.18	28.39	33.39	33.39	28.93	32.06	17.72	37.94	38.07	45.12	51.63	55.79
Cleveland	28.24	31.54	33.44	31.13	28.63	31.81	17.45	42.44	39.27	49.22	55.16	61.24
Denver	32.69	38.65	38.66	42.32	36.91	38.18	22.79	49.35	56.13	65.40	72.50	81.22
Detroit	22.66	31.48	32.73	33.22	28.59	23.84	17.16	38.14	36.36	42.15	50.79	56.90
Houston	23.83	28.28	32.53	41.35	34.12	37.90	17.16	38.14	36.36	42.15	50.79	56.90
Kansas City	23.37	27.16	31.59	30.36	30.20	34.55	17.37	43.29	41.88	50.92	56.17	63.93
Los Angeles	30.02	38.03	39.14	45.66	37.13	38.95	33.49	50.38	62.24	72.33	77.74	89.22
Memphis	31.11	31.16	35.27	37.84	31.07	33.84	32.34	39.82	52.82	56.96	67.85	77.44
Milwaukee	21.60	28.47	30.74	30.92	30.45	30.42	16.02	38.52	36.88	47.20	52.71	59.02
New York	22.00	26.53	30.70	42.40	31.67	32.93	20.83	48.87	50.98	59.83	68.45	75.35
Philadelphia	26.57	34.80	37.22	44.85	33.40	37.64	22.07	47.16	51.67	58.71	67.13	74.37
Pittsburgh	23.85	28.39	32.99	40.86	36.80	22.09	21.35	43.55	48.95	59.88	66.19	72.84
Portland	32.04	37.16	41.51	33.10	34.82	38.20	53.64	56.85	61.00	64.10	66.10	....
San Francisco	29.27	35.77	39.71	45.05	38.70	39.18	31.92	51.14	62.56	71.65	77.93	86.10
Seattle	29.85	35.14	37.88	46.76	32.89	35.32	29.86	51.38	64.02	70.14	73.83	87.67
Spokane	21.08	30.56	33.56	36.69	35.18	25.16	20.32	41.00	42.02	46.30	....	58.32
St. Louis	24.60	29.12	32.77	36.50	28.14	32.45	18.68	42.59	43.13	51.08	58.11	63.64
St. Paul	23.43	27.76	32.10	35.20	29.31	32.38	16.87	43.07	39.20	48.63	51.53	60.75

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ¾-2$^{15}/_{16}$; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1¾" round; Cold drawn—1" round; Hot-rolled 4140—1¾" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

METALWORKING PRICE TRENDS

The sharp markdown in price tags goes on and on

Disinflation continued in motion as 1982 closed and 1983 started.

In the case of the 22 metalworking product lines listed on the table here, the overall rate of price advance over the year—from December 1981 through December 1982—averaged 3.4 pct. That was the lowest over-the-year inflation rate for these product lines in 10 years.

More than that, the price advance rate was less in the last of those months—December 1982—than for the year as a whole. On an annual basis, prices of these products rose by 3.0 pct in December.

In other words, metalworking prices were decelerating further as the year ended.

Prices of producers' finished goods overall showed a similar pattern of disinflation in December. On a December-to-December basis, these prices rose by 3.5 pct. That was the smallest change for any calendar year since the 3.2 pct advance recorded in the 12 months ended in December 1971.

Too, the producer finished goods price hike of 3.5 pct over the year was less than half the hike of 7.1 pct for 1981. And it was light years down from the 12.8 pct and 11.8 pct inflation rates scored in 1979 and 1980, respectively.

In the key metalworking product lines listed here, only the tags for electric motors showed the price-push pressures of the 1979-80 era. These prices rose 1.9 pct in December. That represents an annual rise rate well into the double digits. Demand for electric motors is relatively quite strong.

The overall producer price sag in December, and for 1982 as a whole, was led by actual falling prices for energy goods. These prices declined by 0.1 pct last year. That slide followed rises of 14.1 pct in 1981 and 27.8 pct in 1980.

Predictably, disinflation is causing both cheers and groans. Buyers like it. But many sellers find it squeezing their profits, especially the sharp disinflation experienced recently. However, many economists and business executives seem to feel that the disinflation process has now about hit bottom. A plateauing of prices at the present low level is expected to be the continuing inflation scenario.

Prices of capital equipment bucked the overall softening trend in December—they rose at an annual rate of more than 7 pct.

Latest Month Covered: December, 1982

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	372.7	− 0.1	+ 4.0
Metal Forming Machine Tools	411.8	+ 0.1	+ 4.2
Agricultural Machinery & Equip.	319.9	+ 0.6	+ 5.6
Construction Machinery & Equip.	347.9	0	+ 4.8
Industrial Process Furnace & Ovens	356.4	+ 0.1	+ 4.7
Industrial Material Handling Equip.	286.9	+ 0.2	+ 0.6
Pumps, Compressors & Allied Equip.	348.2	+ 0.1	+ 2.8
Fluid Power Equip. (Dec. 1970 = 100)	248.9	+ 0.7	+ 5.7
Mechanical Power Transmission Equip.	312.0	+ 0.2	+ 1.8
Automobiles	218.8	+ 0.2	+ 1.9
Motor Trucks—Light	275.3	+ 0.5	+ 1.8
Motor Trucks—Heavy	317.5	0	+ 7.6
Railroad Equipment	357.5	0	+ 5.1
Fabricated Metal Structural Products	304.6	+ 0.6	+ 0.5
Electric Motors	298.8	+ 1.9	+ 3.2
Valves & Fittings	323.5	+ 0.2	+ 1.5
Ball & Roller Bearings	335.3	0	+ 4.3
Cutting Tools & Accessories	272.1	+ 0.1	+ 3.1
Heating Equipment	239.3	+ 0.2	+ 4.1
Plumbing Fixtures & Brass Fittings	279.1	+ 0.3	+ 1.9
Metal Containers	325.7	− 0.4	+ 2.8
Miscellaneous Metal Products	288.7	+ 0.1	+ 3.7

Data based on U.S. Labor Dept.'s Producer Price Index

Chilton's

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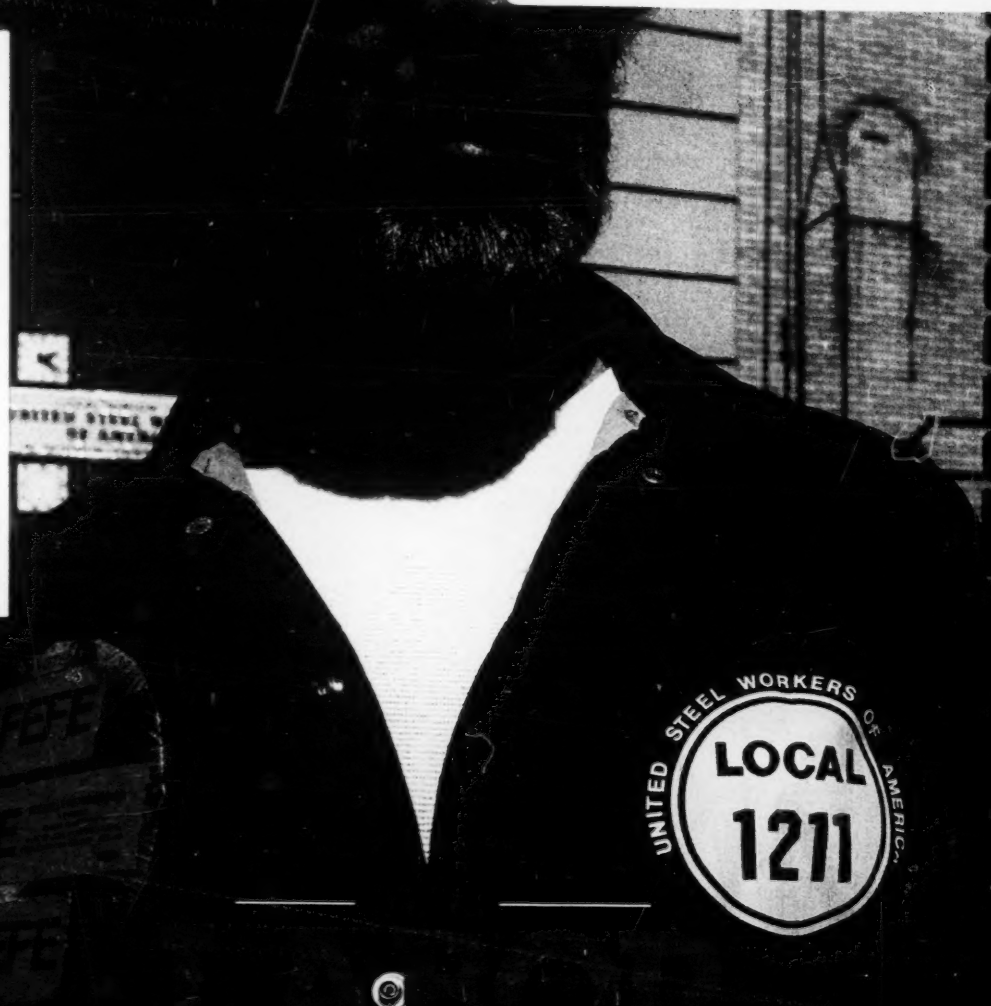

HI-TECH REPORT: MICROALLOYING IN HSLA STEEL

NEW TECHNIQUE PINPOINTS WHAT IS CRITICAL TO JOB SUCCESS

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FEBRUARY 16, 1983

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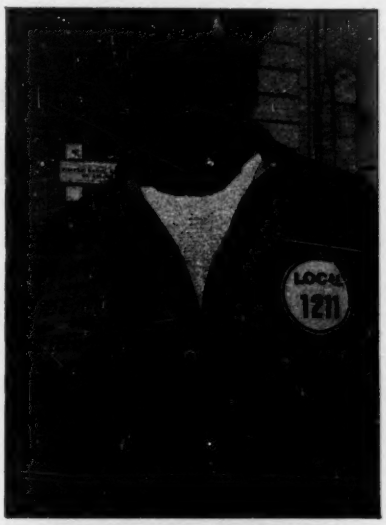

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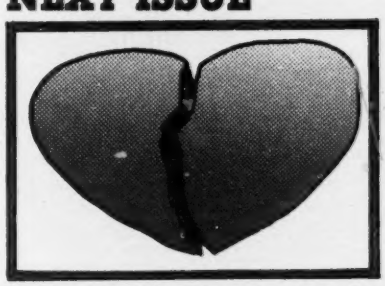

The Love/Hate Response to Automation

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STEEL, NONFERROUS
DEEP IN RED INK

For American steelmakers, 1982 was the worst year in the industry's history. Nonferrous producers saw their profits take a steep slide.

BY GEORGE J. MCMANUS AND ROBERT J. REGAN

Steel

Last year was the worst in the recorded financial history of the steel industry.

With some returns still to come, the industry's losses for the year came to more than $3 billion.

That included some huge write-offs, as well as profits from non-steel operations.

Leaving aside both the write-offs and the outside profits, there is no question the steel industry lost a bundle in 1982.

To find anything remotely like last year, you have to go back to 1938 when the steel industry operated under 40 pct and lost $14.9 million. The previous record for deficits was set in 1933 when the steel industry operated at 33 pct and lost $59.7 million. Steel operations fell to 19 pct in 1932, but the financial records of the American Iron & Steel Institute don't go back that far.

The dollar comparisons are distorted by inflation, but it is no exaggeration to say steel conditions last year were comparable to those in the Great Depression.

This was literally true for the steel operations of United States Steel Corp. "Steel suffered an operating loss of $852 million due to shipments at the lowest level since 1938," said David M. Roderick, chairman of U. S. Steel.

Mr. Roderick cited the "virtual collapse of the market for tubular products, record penetration of domestic markets by unfairly priced imports and continued escalation of labor costs."

The market collapse dropped steel operations below 50 pct for the year. In the last four months of 1982, steel output averaged under 40 pct of capacity. The industry operated well below breakeven, and strenuous price cutting made things a little tougher.

The total effect was disastrous. U. S. Steel reported net losses of $361 million for the year and $363 million for the fourth quarter. The operating loss on steel was balanced by Marathon Oil's operating income of $1.2 billion. On the other hand, the money borrowed to acquire Marathon boosted U. S. Steel's interest charges to $911 million.

Bethlehem Steel Corp. reported a loss of nearly $1.5 billion for the year and more than $1.1 billion for the fourth quarter. These numbers reflected write-off charges of more than $1 billion for the year and over $900 million for the quarter.

Inland Steel Co. lost over $118 million in 1982. That was Inland's first full year loss since 1932. Republic Steel Corp. has a loss of $238 million for the year. Republic's fourth quarter loss was down from the third quarter.

These returns reflected "one of the most depressed years on record," said E. Bradley Jones, chairman of Republic.

Wheeling-Pittsburgh Steel Corp., with the lowest shipments in its history, lost more than $58 million in 1982. Wheeling-Pittsburgh was able to negotiate wage concessions with the United Steelworkers of America (USWA).

Armco Inc. reported a loss of $345 million for the year. Of this, $265 million was due to special charges from plant shutdowns and other adjustments. Armco benefited from the profits of its oilfield and fabricating operations. The company noted that both of these had slipped into the red by the fourth quarter of last year.

National Steel Corp. followed the lead of Bethlehem in taking a licking on write-offs in a period that was bad to start with. In the fourth quarter, National had a pre-tax charge of $286 million from the expected sale of Weirton Steel to employees. The sale hasn't been completed, but National doesn't expect any snags.

"The broad outlines of a potential agreement are clear enough at this time to reflect the anticipated impact of the Weirton sale in National's 1982 results," said Howard M. Love, chairman.

Along with a $60 million write-off for facilities permanently closed, the Weirton charge gave National a net loss of $282 million in the fourth quarter. For all of 1982, the company had a loss of $462.8 million. The loss would have been greater had it not been for a pre-tax gain of $106 million from inventory reductions.

By taking their lumps on special charges in 1982, National, Bethlehem and others have cleared the decks for what they hope will be a profit recovery in 1983. "We expect a modest recovery in the economy, mainly during the second half of 1983, but the first half of the year will be difficult," said Mr. Love.

Cyclops Corp. reported losses of $6.5 million for the fourth quarter and $11.9 million for all of 1982. Cylcops took a

Steel's Fourth Quarter: A New Bottom

In Millions of Dollars

	Earnings		Sales		Pct
	1982	1981	1982	1981	Change
USS	(363.00)	102.00	4,281.00	3,284.00	+30
Bethlehem	(1,146.90)	31.10	1,029.30	1,639.30	−37
LTV	(98.10)	115.90	907.40	1,729.40	−48
Republic	(60.63)	21.71	520.09	975.03	−47
Armco	(183.00)	70.10	1,112.00	1,794.00	−38
National	(282.00)	16.80	663.60	934.11	−29
Inland	(31.46)	(1.64)	624.16	816.27	−24
Total	(2,165.11)	355.97	9,137.54	11,172.11	−18

Steel: A Lopsided Balance Sheet

In Millions of Dollars

	1982 E/S	Earnings 1982	Earnings 1981	Earnings Pct Change	Sales 1982	Sales 1981	Sales Pct Change
USS	—	(361.00)	1,077.00	—	18,907.00	13,941.00	+36
Bethlehem	—	(1,469.60)	210.90	—	5,260.30	7,298.00	−28
LTV	—	(154.90)	386.30	—	4,776.80	7,053.70	−32
Republic	—	(239.22)	190.09	—	2,738.16	4,382.07	−38
Armco	—	(345.00)	294.50	—	5,428.00	6,906.00	−21
National	—	(462.80)	86.10	—	3,090.00	4,160.00	−26
Inland	—	(118.80)	57.26	—	2,807.60	3,754.94	−25
Total	—	(3,151.32)	2,302.15	—	43,007.86	47,495.71	−9.4
Wheel.-Pgh.	—	(58.77)	60.06	—	755.08	1,151.11	−34
Lukens	0.4	1.48	10.63	−86	389.70	405.72	−4
CF&I	—	(23.50)	39.23	—	362.84	723.77	−50
Quanex	—	(17.02)	31.44	—	348.30	416.76	−16
Laclede	—	(8.11)	3.94	—	178.22	252.72	−29
Carpenter*	—	(0.61)	6.70	—	88.39	116.30	−24
Florida*	—	(1.52)	(3.49)	—	50.33	66.83	−25
Interlake	0.8	5.80	46.60	−88	767.30	1,020.00	−25
Cyclops	—	(11.90)	21.40	—	873.20	1,000.00	−13

*Fourth Quarter Only ( ) Parentheses indicate loss

$2.3 million write-off on its steel plant at Portsmouth, Ohio. The plant has been closed for several years and a proposed sale fell through.

"Overall, the losses in the steel segment of our business in the fourth quarter and the year overshadowed profitable results in non-residential construction and specialty retailing," said William H. Knoell, Cyclops president.

The severity of the 1982 depression was brought out when Florida Steel Corp., one of the most successful of the mini-mills, suffered a loss. For the fiscal year ending in September, Florida Steel had a loss of $8.3 million. In the quarter ending Dec. 31, the company lost $1.5 million.

"There's more optimism going around," said Edward L. Flom, chairman of Florida Steel. "We don't see that light at the end of the tunnel, but we are optimistic about our emerging a strong and more profitable company than we are today."

There are some positive elements in the steel outlook. Steel shipments will rise from under 13 million tons in the fourth quarter of 1982 to 14.5 million or 15 million tons in the first quarter of 1983. The indicated first quarter volume won't make anyone rich, but it at least suggests the market has turned upward.

After more than a year of discounting, the mills have been able to put through base price increases for sheet and bars. That doesn't mean the discounting has ended, but the concessions will be made from a higher starting point.

Steel imports fell to 1.09 million tons in December. That was the lowest total for the year. With domestic shipments also down, however, December imports accounted for more than 20 pct of U.S. supply. For all of 1982, imports of 16.6 million tons were more than 22 pct of domestic supply.

All sides hope the steel labor situation will be resolved in the near future. Two management attempts to secure wage concessions were unsuccessful in 1982. However, the last proposal, in November of last year, was endorsed by Lloyd McBride, president, USWA. Mr. McBride has reduced the size of the conference that rejected the November contract.

Nonferrous

About the best thing that can be said for 1982 as far as the nonferrous metals business is concerned, is that it will be an easy year to mark progress against during 1983—although not right away.

A lot of the headaches that plagued the nonferrous metals producers last year—under consumption, bloated inventories, prices below cost of production in most cases, and excess foreign-produced metal around—were carried over into 1983.

These helped splash red ink across a broad spectrum of the nonferrous industries, particularly during the fourth quarter, covering aluminum, copper, nickel and other metals almost without exception.

Fourth quarter net income of North America's four aluminum giants, Alcoa, Alcan, Reynolds Metals and Kaiser Aluminum, fell a combined $236.9 million and would have fallen further except for some extraordinary gains.

Deepening production cuts pulled U.S. primary aluminum output down 27 pct to 3.61 million tons—lowest since 1968—but the producers' inventory situation was a lot slower to respond and the price structure reacted accordingly. The industry's nominal price of 76¢ a lb for primary unalloyed ingot at the start of 1982 got a lot more nominal as the year progressed and most of the rest of the product price list didn't fare much better. Exceptions included rigid container sheet, but even there, sufficient weakness forced a rollback of an early 1982 attempt to raise prices on the industry's biggest volume product.

London Metal Exchange (L.M.E.) prices for primary aluminum kept the ingot price weakness under the spotlight for most of the year. L.M.E. warehouse stocks rose with a big helping of East-bloc metal that was still doing its bit to keep the pressure on as 1983 got under way.

Alcoa Chairman W. H. Krome George noted that the price of primary aluminum "appears to be firming and we are seeing a slight improvement in order rates. Assuming these trends continue, we can expect a slow, modest recovery in 1983."

Alcan Chairman David M. Culver said recent weeks have seen some signs of improvement in business conditions, particularly in the U.S. automotive and housing markets, but "it is still too early to forecast whether these signals are a firm indication of a recovery from the extremely poor business conditions evi-

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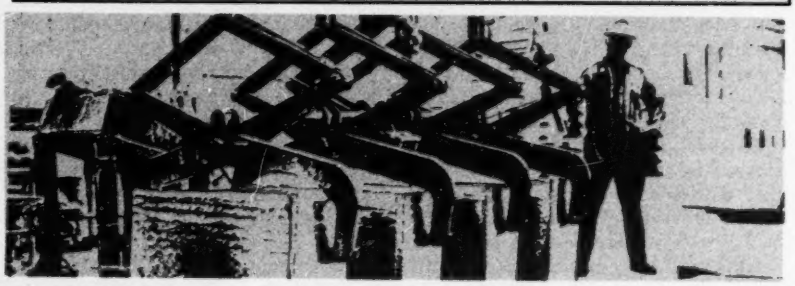
Nonferrous Profits: Less and Less in The Till

In Millions of Dollars

	4th Q '82	4th Q '81	12 months '82	12 months '81
Alcan	(60.0)	26.0	(58.0)	264.0
Alcoa	(33.7)	32.3	10.8	296.2
Falconbridge	(29.3)	(26.2)	(85.3)	(9.0)
Hecla Mining	7.1	0.2	5.1	(1.1)
Inslico	4.4	7.3	14.8	34.1
Kaiser Aluminum	(123.4)	(16.0)	(115.0)	132.9
Martin Marietta	(2.4)	38.6	91.6	200.1
Newmont Mining	17.4	9.9	48.6	375.6
Olin	(3.3)	13.8	53.3	92.8
Oremet	0.2	4.3	6.5	31.2
Phelps Dodge	(9.5)	12.4	(74.3)	69.3
Reynolds Metals	(19.8)	21.1	7.7	86.7
Vulcan Materials	8.1	18.0	54.7	78.2

Alcoa: Net for full year 1982 is after $12.4 million gain from sale of real estate and $19.9 million gain from exchange of stock for debentures. **Falconbridge:** Canadian funds. **Hecla Mining:** Net income for fourth quarter and full year 1981 is after extraordinary credit of $1.93 million from tax-loss carry-forward. **Inslico:** Results for 1981 include gains of $11.8 million in the year and $503,000 in the quarter from sales of Times Fiber common stock. Net for 1982 is after losses of $489,000 in the quarter and $10.9 million in the year from discontinued operations. Net for 1981 includes a gain of $1.96 million from discontinued operations in the fourth quarter and a loss of $5.6 million from same for the year. **Kaiser Aluminum:** Net losses for fourth quarter and full year 1982 include a $14.3 million gain from sale of interest in Comalco Ltd., a net change of $15 million from settlement of litigation and a net loss of $27.4 million from adjustment from sale of certain facilities. Net income for fourth quarter and full year 1981 includes a net gain of $17.5 million from sale of tax depreciations and investment tax credits. **Martin Marietta:** Pretax interest expense totaled $29.4 million in the fourth quarter vs $6 million in same 1981 period, reflecting heavy interest payments on debt incurred during successful rebuff of Bendix Corp. takeover attempt. **Newmont Mining:** Net for 1981 includes gain of $294.6 million from sale and exchange of shares of St. Joe Minerals Corp. and Conoco Inc. **Phelps Dodge:** Net for fourth quarter and full year 1981 includes extraordinary tax-free gain of $10.8 million recognized on exchange of common stock for debentures. **Reynolds Metals:** Net for 1982 is after $4.6 million credit from exchange of common stock for debentures and $26.8 million credit for cumulative effect on prior periods of an accounting change.



dent worldwide throughout all of 1982."

Alcan's shipments last year were up about 10 pct, but "price realizations deteriorated throughout the year, particularly on ingot sales, which were, on average, some 26 pct below 1981 levels," Mr. Culver said.

David P. Reynolds, chairman of Reynolds Metals, said the continuing worldwide recession and intense cost/price pressures eroded margins on many products and hindered the company's performance in 1982.

"We begin 1983 with sluggish demand for aluminum and excessive producer inventories.

"With these adverse conditions, we anticipate operating losses in the first half, but improving performance for the balance of the year as the general economy gains strength and the company continues its stringent cost reductions and productivity improvements," he said.

Kaiser Aluminum & Chemical's aluminum division sustained a pretax operating loss of $114 million in the fourth quarter. Cornell C. Maier, chairman, said the operating loss, which was similar to the results for the aluminum division in the third quarter, reflected weak aluminum prices, poor demand levels, higher production costs and low operating rates.

He said Kaiser doesn't see "material improvement in the aluminum business during the first six months of 1983," but anticipates "some improvement in the second half with continued economic recovery." It's still too early to tell whether recent improvement in the transportation and construction sectors signals a sustained upturn, Mr. Maier said.

Copper prices were weak throughout 1982 and began showing some signs of firmness only in the latter part of January. Domestic mine and smelter production were down sharply but, like aluminum stocks, copper producer inventories were slow to show effect. Phelps Dodge Corp., which suspended production at all its copper mines and concentrators and at its three Arizona smelters back in April 1982, dropped mine production to 150,100 tons last year from 315,700 tons in 1981. Fourth quarter production, with some help from resumption of operations at the Morenci complex, still fell to 44,100 tons from 76,400 tons in the same 1981 period.

Phelps Dodge noted that the average producer price for copper cathodes fell to 72.8¢ a lb last year from 84.2¢ a lb in 1981. The average price in the fourth quarter of 1982 was only 70.6¢ a lb.

The copper company said late in January that it had no immediate plans to resume production at other shut-down mines in Ajo, Ariz. and Tyrone, N.M., although the matter remains under continuing review.

Late January improvement in copper prices began on the hedge markets in New York and London, where traders saw copper prices a bit undervalued, while the U.S. automotive and housing markets were showing some signs of picking up.

While copper producer and hedge market stocks were still rising as 1982 came to an end, consumer inventories were being held at minimal levels. High interest rates encouraged consumers to let their suppliers handle the inventory maintenance chore last year, but interest rates were showing signs of heading lower as 1983 began and this raised the possibility that users might stock up a bit. The U.S. copper producers face another round of wage negotiations this spring; this also may prod some inventory building late in the current period.

Production of nickel, molybdenum, lead and zinc also declined last year and is likely to remain down for at least much of the first half of this year. Low prices on these metals reflected low consumption levels, excess stocks and, in the case of nickel particularly, low-priced offerings from merchants and dealers.

Revere Copper and Brass Inc. said its fourth quarter 1982 results will reflect a provision for reserves approximating $99.8 million. This figure includes $88.3 million applicable to the company's Scottsboro, Ala., aluminum reduction plant, where operations were suspended indefinitely in June 1982.

Despite some recent improvement in free-market aluminum prices, the selling price for primary aluminum remains substantially below the estimated cost of production at Scottsboro, said Revere President William F. Collins. □

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EFFECTIVE JANUARY 31, 1983

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	134	158	123	205
Buffalo	34	30	31	31
Pittsburgh	149	158	127	294
Youngstown	87	82	56	109
Cleveland	93	89	48	119
Detroit	113	116	108	111
Chicago	395	381	373	477
Cincinnati	71	65	62	64
St. Louis	51	54	55	54
Southern	101	110	86	204
Western	63	70	67	110
U.S. Production	1,291	1,313	1,136	1,778

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective January 31, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,291	1,313	5,120	7,121
Capability Utilization Rate	44.5	45.3	42.6	58.4

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/6/83)	25.954	25.954	25.297	25.195
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 66.83	$ 61.50	$ 60.17	$ 84.50
No. 2 bundles	$ 47.17	$ 42.50	$ 41.83	$ 56.50
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh .	$ 69.50	$ 62.50	$ 62.50	$ 94.50
No. 1 steel, Philadelphia	59.50	59.50	56.50	75.50
No. 1 steel, Chicago.....	71.50	62.50	61.50	83.50
No. 1 bundles, Detroit..	60.50	48.50	48.50	83.50
Low Phos., Youngstown	69.50	64.50	64.50	95.50
No. 1 mach'y cast., Pgh	66.50	61.50	61.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	111.50
No. 1 mach'y cast., Chi	109.50	106.50	104.50	124.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective January 31, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	78.00-79.00	77.00-79.00	1/28/83
Lead	21.50-23.00	21.00-23.00	1/28/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	1/11/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.25-$1.40
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $499.50
Indium, dollars per troy oz..... $2.60-$2.85
Iridium, dollars per troy oz..... $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$340-$365
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz..... $13.86
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Jan. 24—578.21 Jan. 27—580.59
Jan. 25—580.46 Jan. 28—581.65
Jan. 26—579.40

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	75⅛	66¼
Yellow brass	63⅛	59⅛
Red brass	69	62⅝
Comm. bronze	70⅞	64
Mang. bronze	62¼	59⅞
Free cutting rod ends	47	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	65
No. 2 copper wire	58
Light copper	49

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	61
No. 2 copper wire	54
Light copper	45
No. 1 composition	51
No. 1 comp. turnings	48
Hvy. yellow brass solids	35
Hvy. yellow brass turnings	26
Radiators	42

Aluminum

New mixed clips	28	—29
Old sheet	26	—27
Old cast	26	—27
Clean dry borings	27	—28

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	23	—24
Mixed L.C. clips	21	—22
Old sheets and cast	15	—16
Borings and turnings	11	—12
Duraluminum clippings	20	—21

Copper and Brass

No. 1 copper wire	50	—51
No. 2 copper wire	43	—44
Light copper	37	—38
Radiators	35	—36
No. 1 composition	42	—43
No. 1 composition turn'gs	40	—41
Cocks and faucets	29	—30
Clean heavy yellow brass	27	—28
Brass Pipe	29	—30
New soft brass clippings	36	—37

Lead

Heavy soft lead	9	—10
Whole batteries	4	— 5
Type metal	14	—15
Electrotype	18	—19

Nickel

Nickel solids	85	— 90
Nickel rod ends	85	— 90
Nickel sheets, clips	85	— 90
Nickel turnings	35	— 40

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

EFFECTIVE JANUARY 31, 1983

MATERIALS NEWSFRONT

(Effective January 31, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	81.00 to	82.00
No. 1 factory bundles (auto)	83.00 to	84.00
No. 2 bundles	49.00 to	50.00
No. 1 busheling	79.00 to	80.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	84.00 to	85.00
Heavy turnings	59.00 to	60.00
No. 1 RR hvy. melting	76.00 to	77.00
Rails 2 ft. and under	85.00 to	86.00
Scrap rails, random lgth.	80.50 to	81.50
RR specialties	78.00 to	79.00
No. 1 machinery cast	66.00 to	67.00
Cupola cast	59.00 to	60.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	440.00 to	450.00
18-8 turnings	340.00 to	350.00

Chicago

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	62.00 to	63.00
No. 1 dealer bundles	77.00 to	78.00
No. 1 factory bundles (auto)	79.00 to	80.00
No. 2 dealer bundles	49.00 to	50.00
No. 1 busheling	76.00 to	77.00
Shredder scrap	74.00 to	75.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	33.00 to	34.00
Low phos. forge crop	85.00 to	86.00
Low phos. punchings plate ¼ in. and heavier	90.00 to	91.00
Low phos. 2 ft. and under	85.00 to	86.00
No. 1 RR hvy. melting	74.00 to	75.00
Scrap rails, random lgth.	69.00 to	70.00
Reroller rails	95.00 to	96.00
Rails, 2 ft. and under	89.00 to	90.00
RR couplers and knuckles	79.00 to	80.00
RR car axles	104.00 to	105.00
No. 1 machinery cast	109.00 to	110.00
Cupola cast	94.00 to	95.00
Stove plate	84.00 to	85.00
Steel car wheels	79.00 to	80.00
Stainless		
18-8 bundles and solids	410.00 to	420.00
18-8 turnings	310.00 to	320.00
430 bundles and solids	90.00 to	95.00
430 turnings	65.00 to	70.00

Philadelphia

No. 1 hvy. melting	$ 58.00 to	$ 61.00
No. 2 hvy. melting	51.00 to	54.00
No. 1 dealer bundles	73.00 to	76.00
No. 2 dealer bundles	41.00 to	44.00
No. 1 busheling	73.00 to	76.00
Shredder scrap	70.00 to	73.00
Machine shop turn.	19.00 to	22.00
Mixed bor. and turn.	19.00 to	22.00
Shoveling turnings	34.00 to	37.00
Clean cast chemical borings	40.00 to	43.00
Low phos. 5 ft. and under	69.00 to	72.00
Low phos. 2 ft. punchings	85.00 to	88.00
Electric furnace bundles	85.00 to	88.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	89.00 to	92.00
Cupola cast	56.00 to	59.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 52.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	60.00 to	61.00
No. 2 bundles	30.00 to	31.00
No. 1 busheling	59.00 to	60.00
Drop forge flashings	37.00 to	38.00
Machine shop turn.	21.00 to	22.00
Mixed borings and turn.	11.00 to	12.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	10.00 to	11.00
Heavy breakable cast	29.00 to	30.00
Mixed cupola cast	45.00 to	46.00
Automobile cast	65.00 to	66.00
Stainless		
18-8 bundles and solids	355.00 to	365.00
18-8 turnings	235.00 to	245.00
430 bundles and solids	85.00 to	95.00

Youngstown

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	76.00 to	77.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	69.00 to	70.00
Electric furnace bundles	75.00 to	76.00
Galvanized bundles	65.00 to	66.00

Cleveland

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	72.00 to	73.00
No. 1 factory bundles	81.00 to	82.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	72.00 to	73.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	87.00 to	88.00
Low phos. punchings plate	87.00 to	88.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	89.00 to	90.00
Rails, 18 in. and under	90.00 to	91.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	79.00 to	80.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	275.00 to	285.00
18-8 turnings	225.00 to	235.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 25.00 to	$ 26.00
No. 2 hvy. melting	15.00 to	16.00
No. 1 busheling	30.00 to	31.00
No. 1 dealer bundles	28.00 to	29.00
No. 2 bundles	12.00 to	13.00
Machine shop turn.	1.00 to	2.00
Mixed bor. and turn.	8.00 to	9.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Low phos. plate	48.00 to	49.00
Structural and plate, 2 ft. and under	46.00 to	47.00
Rails, 2 ft. and under	42.00 to	43.00
Scrap rails, random lgth.	22.00 to	23.00
No. 1 machinery cast	63.00 to	64.00
No. 1 cupola cast	42.00 to	43.00

St. Louis

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	44.00 to	45.00
Foundry steel, 2 ft.	44.00 to	45.00
No. 1 dealer bundles	52.00 to	53.00
No. 2 bundles	41.00 to	42.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	52.00 to	53.00
Rails, random length	49.00 to	50.00
Rails, 18 in. and under	64.00 to	65.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 56.00 to	$ 57.00
No. 2 heavy melting	52.00 to	53.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	40.00 to	41.00
No. 1 busheling	54.00 to	55.00
Shredder scrap	69.00 to	70.00
Machine shop. turn.	18.00 to	19.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	53.00 to	54.00
Elec. furnace, 3 ft. & under	50.00 to	51.00
Structural and plate, 2 ft.	70.00 to	71.00
Structural and plate, 4 ft.	69.00 to	70.00
No. 1 RR hvy. melting	55.00 to	56.00
Scrap rails, random lgth.	57.00 to	58.00
Rails, 18 in. and under	75.00 to	76.00
Angles and splice bars	67.00 to	68.00
No. 1 cupola cast	74.00 to	75.00
Unstripped motor blocks	52.00 to	53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 43.00 to	$ 44.00
No. 2 hvy. melting	42.00 to	43.00
No. 1 dealer bundles	44.00 to	45.00
No. 2 bundles	27.00 to	28.00
Machine shop turn.	3.00 to	4.00
Shoveling turnings	6.00 to	8.00
Cast iron borings	8.00 to	9.00
Low phos. 18 in. and under	68.00 to	69.00
Rails, random length	50.00 to	51.00
Rails, 2 ft. and under	72.00 to	73.00
No. 1 cupola cast	60.00 to	61.00
Heavy breakable cast	24.00 to	25.00
Drop broken cast	64.00 to	65.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 29.00 to	$ 30.00
No. 2 hvy. melting	25.00 to	27.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	375.00 to	400.00
18-8 turnings	260.00 to	280.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 30.00 to	$ 32.00
No. 2 hvy. melting	20.00 to	22.00
No. 1 dealer bundles	34.00 to	36.00
No. 2 bundles	18.00 to	20.00
No. 1 busheling	34.00 to	36.00
Shredder scrap	38.00 to	40.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	1.00 to	2.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	23.00 to	25.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	27.00 to	29.00
No. 1 dealer bundles	25.00 to	27.00
No. 2 dealer bundles	8.00 to	10.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 53.00 to	$ 55.00
No. 2 hvy. melting	42.00 to	44.00
No. 2 bundles	32.00 to	34.00
No. 1 cupola cast	88.00 to	90.00
Mixed yard cast	78.00 to	80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 33.00
No. 2 heavy melting cut 2 ft. and under	30.00
No. 1 dealer bundles	40.00
No. 2 bundles	5.00
Mixed steel scrap	17.00
Bush. new fact. prep'd.	38.00
Bush. new fact. unprp'd.	30.00
Machine shop turn.	18.00
Short steel turn.	21.00
Mixed bor. and turn.	10.00
Cast scrap	30.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	40.00 to	41.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	12.00 to	13.00
Crushed turnings	24.00 to	26.00
Shredder scrap	52.00 to	53.00
Cut structural plate 2 ft. and under	74.00 to	76.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	66.00

METALWORKING ORDER TRENDS

Defense orders soar, but a broader-based pickup is needed

Defense business came on like the Kemper Cavalry in December and saved the day for durable goods new orders.

In the last month of the year, these orders rose by 11.5 pct from November to $78.7 billion. That was, by far, the strongest monthly orders increase for the entire year.

But there was a sort of Catch 22 to the great December orders showing. Some 85 pct of the gain was due to an open-the-dam release of defense-related orders. Orders for Naval work on ships and for military tanks rose by $4.4 billion. Orders for military aircraft, missiles and parts rose by $2.0 billion. Also, orders for defense-related communication equipment went up by $500 million.

All-in-all, the military accounted for some $7.0 billion of the $8.1 billion rise in December orders for durable goods.

Defense orders cannot be counted on to repeat that strong showing in months to come. These orders are the most volatile element in the durable goods orders spectrum. They might be up only a tad in January—or up a lot. Then again, they may fall like a rock. That's the way it is with defense orders.

Still, the December $7.4 billion rise in backlogs of unfilled defense capital goods orders will help many metalworking companies in the months ahead as sub-contracts are let out. This is needed help. The backlog of nondefense orders itself has been in a slide since hitting a peak in January 1981 when the volume was 27 pct greater than at the close of December 1982.

The great weakness last year in heavy goods manufacturing shows in clear perspective when its order levels are compared with U.S. overall economic growth—the gain in current dollar Gross National Product. GNP rose an estimated 4.2 pct last year; durables new orders fell by 10.2 pct.

The lag may well go on a bit longer. As shown in December, no broadly-based upward orders movement was apparent.

In fact, for all U.S. manufacturing (durables and nondurables) in December, dollar volume of new orders—excluding defense orders—were actually down by 0.1 pct.

One source of hope for an orders turnaround continues to be found in thinning inventories. Durable goods stocks were down by $1.6 billion in December, the tenth straight month of decline.

Source: U.S. Dept. of Commerce Billions of dollars, seasonally adjusted monthly total, unless otherwise noted		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
Capital Expenditures (Annual Rates)				
U.S. Industry, Total	4th Qtr.	$315.2*	$315.8	$327.8
Manufacturing, Total	4th Qtr.	120.5*	119.5	126.9
Manufacturing, Durable Goods	4th Qtr.	55.8*	57.1	60.8
Mining Industry	4th Qtr.	15.6*	14.6	16.8
Key Indicators, Durable Goods Manufacturing				
New Orders	Dec.	78.7	70.6	76.4
Shipments	Dec.	72.7	72.7	79.1
Inventories	Dec.	177.7	179.3	188.4
Unfilled Orders	Dec.	287.9	281.9	308.4
New Orders, Metalworking				
Capital Goods Producers, Nondefense Industries	Dec.	20.6	20.2	22.1
Capital Goods Producers, Defense Industries	Dec.	12.5	5.1	5.6
Primary Metals, Total	Dec.	6.9	7.5	9.4
Steel (SIC 331)	Dec.	2.5	3.1	4.9
Iron & Steel Castings (SIC 332)	Dec.	.7	.7	1.2
Nonferrous Metals	Dec.	3.7	3.7	3.7
Nonelectrical Mach.-Equip. Industries, Total	Dec.	14.1	13.0	17.6
Engines & Turbines	Dec.	.9	.9	1.7
Farm Machinery & Equipment (Shipments)	Dec.	1.0	1.1	1.2
Construction, Mining & Materials Hdlg. Equip.	Dec.	1.8	2.4	3.3
General Industrial Machinery	Dec.	1.2	1.0	1.5
Fluid Power Equipment** (Index-1972=100)	Dec.	163	170	251
Metalworking Machinery	Dec.	.6	.6	.5
Machine Tools, Total (Millions $, unadjusted)***	Dec.	121.7	88.2	151.8
Machine Tools, Metal-Cutting***	Dec.	86.6	62.8	112.6
Machine Tools, Metal-Forming***	Dec.	35.1	25.4	39.2
Electrical Mach. & Equip. Industries, Total	Dec.	12.7	12.2	11.7
Elec. Transmission Equip. & Industrial Apparatus	Dec.	1.7	1.8	1.9
Household Appliances	Dec.	1.0	1.1	1.0
Communication Equipment	Dec.	4.8	4.3	3.4
Transportation Equip. Industrial, Total	Dec.	21.5	14.6	16.1
Motor Vehicles & Parts (Shipments)	Dec.	8.4	8.1	10.0
Aircraft, Missiles & Parts	Dec.	7.2	5.2	4.7
Shipbuilding & Military Tanks	Dec.	5.3	.9	.6
Fabricated Metal Products, Total	Dec.	8.5	8.2	9.3
Instruments, Total	Dec.	3.7	3.8	4.1

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA.

HOW THE MACHINING CELL MAKES FLEXIBILITY GO

WILLIAM DRAPER, CHAIRMAN EXPORT-IMPORT BANK, TALKS ABOUT PROTECTIONISM

Chilton's

FEBRUARY 25, 1983

IRON AGE

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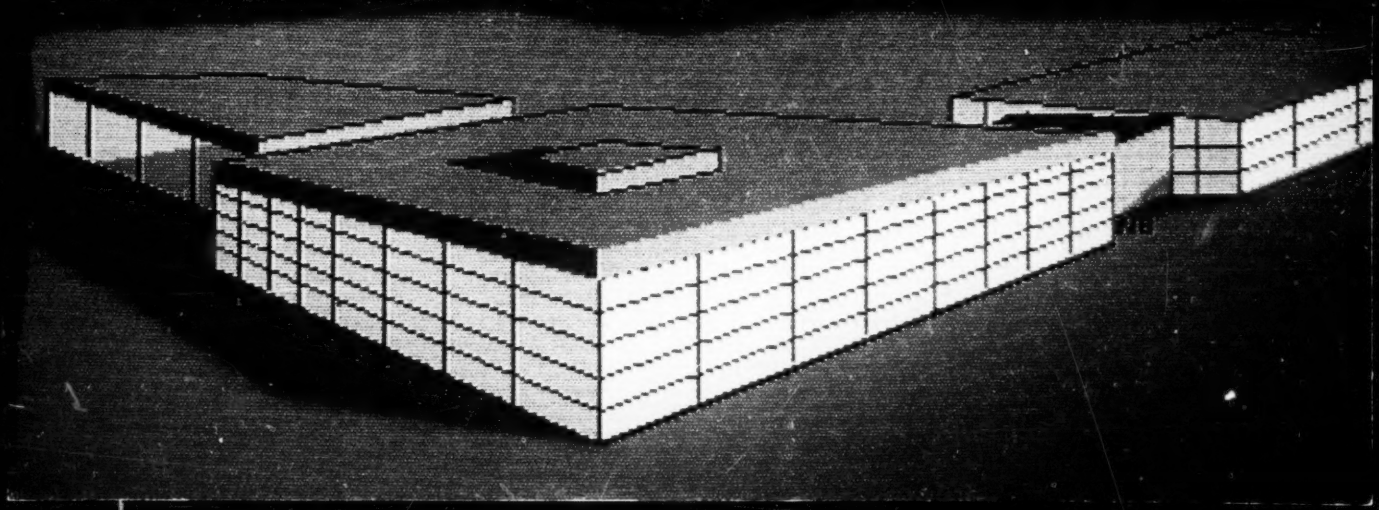
FACTORY OF THE FUTURE

THE LOVE/HATE RESPONSE TO AUTOMATION



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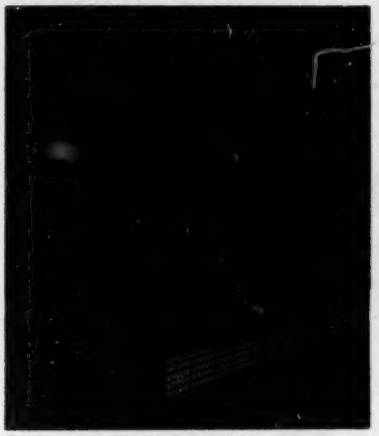

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HARD TIMES COME TO THE OIL PATCH

Both the major oil companies and the independents are cutting their spending on exploration and production this year.

BY SUSAN T. PARKER

A year ago the majority of U.S. oil companies—buoyed by the frenetic drilling pace of 1981—announced ambitious domestic exploration and production (E&P) budgets for 1982. They had good reason to believe that 1982 would be as good, if not better, than 1981.

But they were wrong—dead wrong. As the year wore on, oil prices softened, a natural gas 'bubble' took hold, and the weekly drilling rig count continued its precipitous slide. A general 'gloom and doom' attitude enveloped the entire energy industry; this contrasted sharply with the 'boom' attitude of 1981. As a result, many of the ambitious E&P budgets of major and independent oil companies fell by the wayside.

Companies that initially had planned to spend several billion dollars on domestic exploration and production in 1982 wound up having to scale back their budgets considerably. Needless to say, this severely impacted the profit pictures for producers and distributors of oil country tubular goods (OCTG) and oilfield equipment.

Now, oil companies are once again faced with the necessary, but highly-speculative task of ironing out their E&P budgets for 1983. Understandably, they are still smarting from last year and, as a result, are cautious and conservative about their budget forecasts. Some of the larger oil companies are refusing altogether to publicly announce their 1983 E&P budgets for fear that they might have to eat their words later on if U.S. drilling activity worsens. They had to do this in 1982 and so they are trying to avoid a repeat performance this year.

This cautious stance is, in fact, a sign of the times. Said one industry observer, "When times are great, they (the oil companies) disclose everything. But now they are playing it close to the vest and are not making any budget commitments." An industry analyst agreed, noting that he surveyed major oil companies about their 1983 E&P budgets, but only received "vague" and "cautious" responses. "They are not giving specific (budget) numbers," he added.

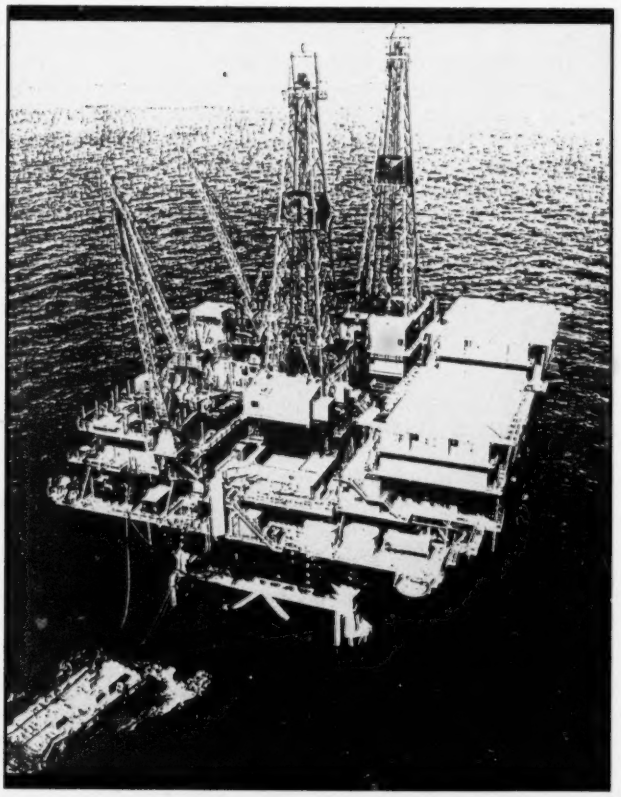
To say the least, this does not bode well for those firms that supply services and equipment to the oil industry. They find themselves two months into the new year with no clear-cut picture of oil company spending plans. At best, they are having to hazard guesses.

One survey that several energy sup-

U.S. Oil Exploration Expenditures 1983 vs '82
Major Oil Companies, In Millions of Dollars

	1983 Est*	1982 Est	Pct Chg.
Amerada Hess	430	390	10
Atlantic Richfield	3,150	3,000	5
Du Pont (Conoco)	775	775	—
Getty	1,400	1,300	15
Gulf	1,450	1,550	−6
Mobil	1,775	1,900	−7
Occidental	475	695	−32
Pennzoil	365	380	−4
Phillips	650	625	4
R.J. Reynolds	445	410	8
Shell	2,600	2,600	—
Sohio	2,000	2,000	—
Standard of Calif.	1,950	1,900	3
Standard of Indiana	2,200	2,200	—
Sun	750	950	−21
Superior	925	975	−5
Tenneco	1,200	1,250	−4
Texaco	1,800	1,600	13
Texas Oil & Gas	470	435	8
Union Oil	900	900	—
Union Pacific	500	450	11
U.S. Steel (Marathon)	500	500	—
Total	**26,710**	**26,785**	**−0.3**

*Estimates by E. Salomon Brothers



pliers seem to be relying on was conducted by James Crandell, vice president, New York-based Salomon Bros. Inc. It contains both good and bad news. "The good news is that most major oil companies, who represent more than 50 pct of total industry spending, intend to at least maintain their 1982 level of E&P expenditures in 1983," the survey says.

Mr. Crandell surveyed 22 major oil and gas companies and found that 1983 E&P expenditures on the average will be about 3 pct, or $75 million, lower than last year (see chart).

Now for the bad news. Independent oil and gas companies, who drill 85 pct of all wells, have cut their E&P spending plans sharply for 1983, reports Mr. Crandell. "Of the 64 independents we surveyed, expected E&P spending for 1983 declined 23 pct, on average, from 1982," the report notes. Mr. Crandell estimates that E&P spending by independents this year will average $5.4 billion compared to $7 billion in 1982.

"While these spending plans (by majors and independents) are certainly not set in stone, it is important to note that oil companies decided on their budgets in an environment of weakening oil prices, poor refining/marketing earnings and declining natural gas sales and are using very conservative economic assumptions in their forecasts," the survey says.

Some of the major conclusions reached by Salomon Bros. in its survey include:

—The difference between major (−3 pct) and independent (−23 pct) company spending plans in 1983 is highly significant. Of the 64 independents surveyed, 41 anticipated lower E&P spending in 1983 while only seven of the 22 majors surveyed expected lower E&P spending this year.

—Nominal drilling expenditures will decline by about 8-10 pct this year. "With drilling costs expected to drop another 5-8 pct, we believe that real levels of drilling activity in 1983 could be close to those of 1982," the survey says.

—Most of the cuts in independent oil and gas company drilling budgets are coming from the natural gas segment. Due to reductions in gas purchases by the pipelines, many substantial independent gas producers are producing natural gas at only about 50 pct of effective capacity.

—Almost every independent oil and gas company surveyed is moving away from deep gas drilling because of lower deep gas prices, a reduction in gas sales, the difficulty in hooking up wells, overpressurized zones, and the feeling that the technology is not adequate. These problems are particularly acute in Oklahoma's Anadarko Basin.

—Most independents and many majors are emphasizing drilling on oil prospects. The elimination of the windfall profit tax on stripper oil for certain independents (as defined by the Federal Windfall Profits Tax Act) should result in a substantial improvement in realizations to these companies and a sizeable pickup in this type of drilling.

—Because of cash flow considerations, most companies are emphasizing development drilling over exploratory drilling.

—Spending on offshore leases by the majors should remain substantial in 1983 due to the large amount of prospective acreage that will become available in Alaska and the Gulf of Mexico this year.

For the most part, executives of energy and energy-related firms agree with the results of the Salomon Bros. survey. "We expect the majors' E&P budgets to be relatively flat in 1983 and the independents to be lower. How much lower I can't say; I don't think anybody knows at this point," says Ike C. Kerridge, vice president of stockholder relations, Houston-based Hughes Tool Co., a major producer of oilfield equipment.

Many of the larger oil companies have yet to announce their 1983 E&P budgets.

Overall, Mr. Kerridge expects "slightly lower" drilling activity in the U.S. this year. He estimates that the weekly domestic rig count in 1983 will average 2,675 rigs compared to 3,105 rigs last year. Moreover, he expects the amount of footage drilled this year to drop 9 pct to 312 million ft.

Mr. Kerridge also believes that the pattern of drilling activity in 1983 will be the reverse of last year. "We think drilling will be down (by about 350 rigs) in the first quarter and up the last three quarters," he said. Last year, drilling activity fell the first three quarters and finally rose in the last quarter.

Separately, Tenneco Oil Co. reports that its E&P budget, though still not approved, will be "roughly the same" as 1982. "The mix is going to be different," a company official says, explaining that more capital will be put into exploration and less into production wells.

"We don't need to produce. Why produce the stuff (oil and gas) when you can't sell it. What we are hoping to do is build up our reserves for when the market does pick up," the Tenneco official explains. He further notes that Tenneco will most likely be concentrating on shallower prospects in 1983.

Despite its flat 1983 E&P budget, Tenneco sees a good year ahead. "I don't think the year is going to be as bad as some people believe it will be," the Tenneco official notes. "Normally a flat capital budget would mean you would drill less wells, but that's not necessarily the case this year. Drilling costs have declined considerably in many areas (and) a lot of services have dropped in prices. Because of this, I believe about the same number of wells will be drilled in 1983 that were drilled last year."

Similarly, Pittsburgh-based Gulf Oil Corp. reports that its E&P budget this year will either be "slightly less" or "on the same magnitude" of its 1982 E&P budget. Its capital spending plans, the company says, still have yet to be approved.

Adobe Oil & Gas Corp., an independent oil and gas firm based in Midland, Texas, says that it also intends to maintain about the same level of drilling activity in 1983. Its E&P budget is expected to be in the range of $50 million, according to Curtis S. Bedrich, vice president, finance.

Mr. Bedrich says the company's plans call for both oil and gas drilling in 1983. He added, however, "We would tend towards oil (exploration) if we have to make a choice." He also says that Adobe will probably be emphasizing developmental drilling this year more than wildcat drilling.

Shell Oil Co., Houston, reports that its overall capital expenditure budget for 1983 will be $3 billion. Approximately $660 million of this will be earmarked for exploration, a Shell spokesman says. This is $30 million more than was spent in 1982.

Houston-based Superior Oil Co. plans capital and exploration spending of $1.2 billion in 1983, down from $1.3 billion a year ago. Of this amount, Superior says it expects to spend about $780 million for exploration and production activities in the U.S. This is considerably lower than the $925 million that the Salomon Bros. estimated Superior would spend in 1983.

Many of the larger integrated oil companies, most notably Exxon Corp., have yet to announce their 1983 E&P budgets, and probably will not do so for another month. They are closely tracking first quarter drilling activity before committing themselves. Says one industry insider, "A lot depends on the first quarter." ❑

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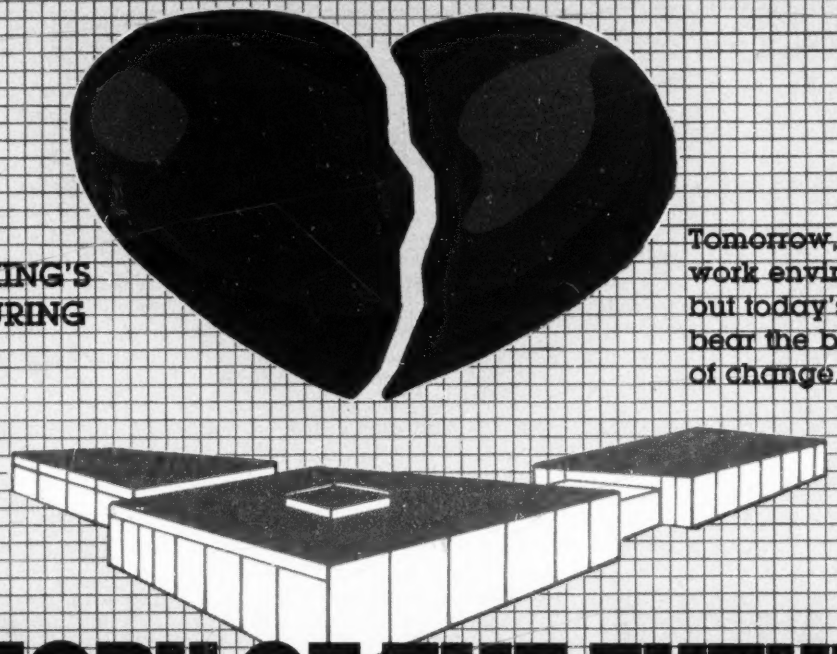
METALWORKING'S MANUFACTURING SYSTEMS

Tomorrow, a better work environment, but today's workers bear the burden of change.



FACTORY OF THE FUTURE: THE LOVE/HATE RESPONSE TO AUTOMATION

BY ALICE M. GREENE

Workers in a faceless environment, devoid of human interchange, taking orders from talking machines and CRT screens with a elite corps of technologists in white coats running these machines from a remote and sterile computer room—could this be the factory of the future?

Hardly a phrase has been as widely used as "factory of the future" and with as much ambiguity. The promises and pitfalls of this concept are touted and decried daily.

Truth is, definitions of the factory of the future vary widely. And many opinions expressed are prompted by fear, ignorance or both.

A definition often attributed to blue collar workers is that the factory of the future is one in which machines are doing work that previously was done by semi-skilled or unskilled humans. Those people think of the future factory as being populated by computer-controlled assembly, welding and inspection robots—all of which replace people, says Richard N. Spann, president of Adage, Inc., a Boston-area firm, whose computer graphics systems usher computer-aided design into the forward-looking factory.

Managers, designers, engineers, on the other hand, may have a completely different concept. Their concept of the factory of the future is one that is computer-driven, not human-driven.

This point of view sees computers enhancing human thought processes and expanding an individual's potential in a more creative work environment.

"These conflicting views reflect a lack, not so much of understanding because it is clear that both things will happen,

but rather an ambiguity of how they are going to happen, and in what time sequence," comments Mr. Spann.

There is activity in both areas at the present time. Quite a few robots already work in our factories, although today's robots are relatively simple in function and in control compared to what lies ahead.

At the other end of the spectrum, computer-aided design and computer-aided engineering are evidence of thought processes that are being computer assisted.

Between these extremes, there exists a huge gap. Advanced manufacturing concepts such as group technology and process planning need to be implemented. Automated material handling techniques need to be incorporated into the production flow.

Actually, much more effort is needed in making the production cycle a more continuous process from design through manufacturing.

All these technologies need to be managed with planning, scheduling and control systems. And the coordination of all these technologies must be accomplished with communications systems and data management systems. When all these ingredients are integrated, the factory of the future will exist. This isn't going to happen overnight.

In a sense, present day reactions to the factory of the future are like feeling the pain of the dentist's drill before you even get to the office, in some cases, before you even make an appointment. It may not be as traumatic as you think.

Such 'advance reactions' are human. So is the fear of change. And, so is the excitement created by a new technology. The fascination with and popularity of science fiction books and films over the years is evidence that many people find 'futuristic' developments intriguing, even if a bit intimidating.

Positive and negative reactions exist in the public's mind about the future factory.

A public opinion report, recently conducted by Opinion Research Corp. (ORC), Princeton, N.J., reveals that Americans anticipate several positive benefits for productivity and the U.S. economy if automation is increased.

"The vast majority of the public think that American-made products would be more competitive in world markets, perhaps due, in part, to the widespread feeling that the quality of U.S. goods would improve," says Kenneth Schwartz, vice president, ORC. "The majority of people think U.S. products would be more competitive in world markets.

"At least seven people in ten in almost every segment of the population look for a significant increase in economic growth and productivity in the country. A majority of people in almost all subgroups expect living standards to improve," adds Mr. Schwartz.

An improved economy and standard of living—very positive expectations existing in the midst of fear of losing jobs to automation, near despair about the possibility of retraining for new skills.

What seems clear is that ultimately, the factory of the future will use fewer people. Figures issued by the Bureau of Labor Statistics on the distribution of employed workers shows a decrease in the industry segment from 30 pct of the work force in 1960 to 25 pct in 1985. And this shift will continue. The declining birth rate, the shift of jobs into the service sector, and the unpleasantness of many factory jobs are some of the reasons for this shift, in addition to the drive to automation.

There will be a need for higher skill levels. Skilled machinists, computer programmers and operators, maintenance electricians will be in short supply. Knowledge workers, engineers, designers, scientists, systems people will find jobs aplenty.

At the lower levels, some jobs will be upgraded as workers learn to use computer assists. Many will find jobs more interesting, more challenging, because through computer assistance, they can know more about how their jobs relate to the broader factory environment.

"A lot of assembly line workers have been bored into ulcers by the drudgery and monotony of the work," says Robert B. Vollum C.P.I.M., senior manufacturing consultant, Sperry Univac.

The picture is not rosy, however. There will be massive displacements. Entire industries will change in size and importance, and the workers from those industries will have to undergo retraining and/or relocation to find jobs. Geographic areas will be hard hit.

Even those who have jobs will face a major readjustment—that includes managers as well as shop floor personnel.

The shock of automation, the impact of the factory of the future will come gradually to some, suddenly to others.

It will produce a better work environment eventually. "There are going to be three basic changes involving the factory worker," said James L. Ridings, P.E., manager, Staunton Operations, McQuay-Perfex Inc., Staunton, Va. in a presentation at the Autofact 4 Conference.

"The first change will be fewer work-

Automation is perceived as a heartless monster bent on the destruction of the unskilled worker.

ers in the factory, fewer people assembling parts, fewer people doing the individual processes. Second, the need for the people in the factory is going to switch from one of performing work to one of providing the maintenance and upkeep of the systems and machines that are actually doing the work.

"Finally, the education level of entry level workers has increased to a point where they are dissatisfied with the normal labor of factory jobs," Mr. Ridings continued.

Getting to the future factory may not be smooth. Fear, resistance, and ignorance will cause early stumbling blocks. Training and retraining can reduce these problems dramatically though. In cases where workers have been involved in the introduction of automation and have had time to learn the advantages of automation, see how it works and see how their jobs fit into the new scheme of things, the transition to automation has been smooth.

Thomas G. Gunn, manager of the Computer Integrated Manufacturing (CIM) Group of Arthur D. Little, Inc. believes that training workers whose skills have become obsolete to accept and use the equipment is so important that educational programs will have to rank as a top priority over the next decade.

He predicts that in ten years nearly all manufacturing employees—from shop floor to top management—will be spending roughly one day in five in seminars and training programs to keep pace with new technology.

The opportunities automation offers are many—a better standard of living, a stronger competitive position in world markets, and better jobs. The problems that stand in the way must be overcome. There is no alternative.

Conversion to the factory of the future is a slow, arduous process measured against world time, but not against an individual's clock.

The widespread use of factory automation will have a significant impact on the social milieu of all industrialized nations. One of the most formidable challenges created by factory automation is the task of retraining labor and restructuring jobs to comply with automated production, according to a recent market study by Venture Development Corp., Wellesley, Mass.

"This is particularly true for industrial robots which, because of their similarity to human motions, raise the spectre of a society dominated by machines and a ruling elite. Already the mass media have coined the name 'steel collar workers' for robots and frequently carry reports about their increasing use," says the study. "For the large number of blue collar workers affected by the current economic downturn and high unemployment, such reports are bound to generate concern."

The Japanese have had tremendous success in the introduction of new technology in the workplace. Some insights into how they have accomplished this, which might aid U.S. companies, are described by Dr. James O'Toole, professor of management, University of Southern California.

"First of all, they offer job security; people are not afraid they will lose their jobs when the new technology is introduced. Second, they start with a relatively well educated work force. Their people have learned how to learn. Assembly line workers will be trained to install or monitor or to repair the new technology; the workers know they will be trained for the new jobs.

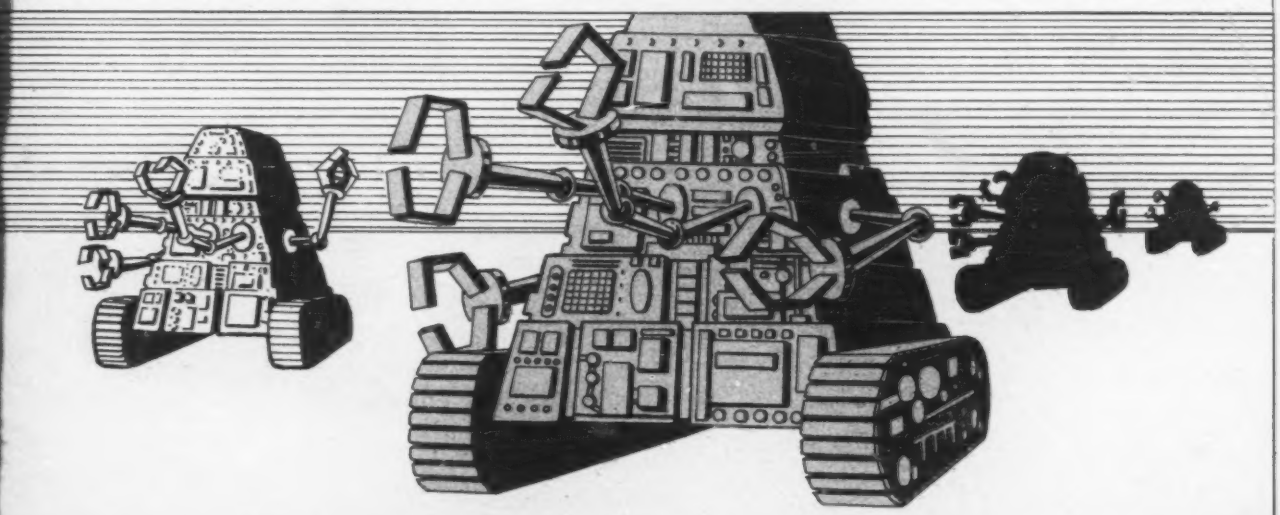
"The third fact is that a major effort is made beforehand to explain to everybody why the new technology is necessary," says Dr. O'Toole.

"The American system is just the opposite of all those things. Someone somewhere makes the decision to automate. The worker suddenly sees a machine coming through the door and feels, 'One, I'm incapable of doing this job; I've never touched a computer in my life. Two, I'm going to lose my job.' Often times he's right on both counts."

The switch to automation is not just a spectre for the blue collar worker. The public opinion study undertaken by Opinion Research shows that there is widespread anticipation that, by the end of the century, both white-collar and blue-collar jobs will be affected to about the same extent.

Moreover, almost two-thirds of the public believe that a great many, if not all, workers will have to learn new skills if automation of the U.S. workplace is significantly increased, according to Mr. Schwartz.

And, despite some of the optimistic conclusions of the study mentioned earlier, Americans have serious misgivings about job security in the face of increased automation. "Nine people in



ten anticipate that employees would be afraid of losing their jobs as a result of automation. In fact, a majority of people believe that, even in the long run, job opportunities in the country would be reduced," says Mr. Schwartz.

Apprehension about loss of job status, too, is generally viewed by the public as likely to occur among employees who face stepped up automation. And more than eight people in ten expect that employees would fear the problems they might encounter in learning new skills. Yet another negative result of increased automation, foreseen by both blue-collar and white-collar employees, is increased pressure on the job.

People in all occupation groups rate opportunities for advancement a toss-up; relatively few expect workers to have more freedom to decide how to do the job.

However, when people consider the possible effects of increased automation on the kind of job they know most about, they anticipate only one positive development, according to the ORC study. No matter what their occupation, people are inclined to agree jobs would be interesting and challenging.

"Almost two-thirds of Americans say that they would resist automation at least a fair amount if it were to increase significantly at a company where they or someone in their family works.

"Women are far more likely than men to oppose such a change, and nonwhites are considerably more negative to the idea than whites. The older people are and the lower their educational level, the more unwilling they are to accept increased automation in the workplace," according to ORC findings.

All in all, comments Mr. Schwartz, "It seems evident that the rapid advance in automation may present the business community with one of the most serious challenges of the century."

What is needed is some way to calm the fears of workers and lead them as gradually as possible into the more interesting and challenging jobs that lie ahead.

There are several factors which complicate a smooth transition.

First, the dismal economic picture of the last year or so has already created so much unemployment and so much fear and resentment on the part of so many, that the effects of automation seem just one more burden on the backs of the working people, a sort of 'last straw.'

Second, the adversarial relationship of unions and management has created a backdrop of distrust that has been around so long, it is hard for either group to really accept a willingness to work together on this issue.

Then, too, most of the technological advances stem somehow from the power of the computer. For many of the older workforce—and in this context older can be 35—the computer is still a foreign object, cloaked in mystery. "Most 9th grade students have a better understanding of computers than many adults," says Adage's Mr. Spann.

"The concept of a formal algorithm is foreign to most people. They do not understand the logical process of telling a computer what to do. It is a very basic change in thought, in conceptualizing, to think of a process as broken down into a series of primitive steps with the computer doing nothing but executing or interpreting each one of these steps or instructions," adds Mr. Spann.

"We see too many people totally perplexed by what is going on and all the adult education and all the public television and everything else is not going to strike this home. We are literally going to wait half a generation until the people who are currently being taught these concepts move into industry," he says.

None of this will impede the onslaught of automation, but it is going to impede making everyone's understanding and acceptance of it crystal clear.

"People are going to be force fed," says Mr. Spann. And not just shop level people.

Mr. Spann gives an example of the kind of shock that is in store for many. "There will be an inventory control manager who used to worry about next week's parts being told by the computer that given the current order lead times, he is already out of parts for April of next year. Whereas, before automation, the manager would wait eleven months to find out.

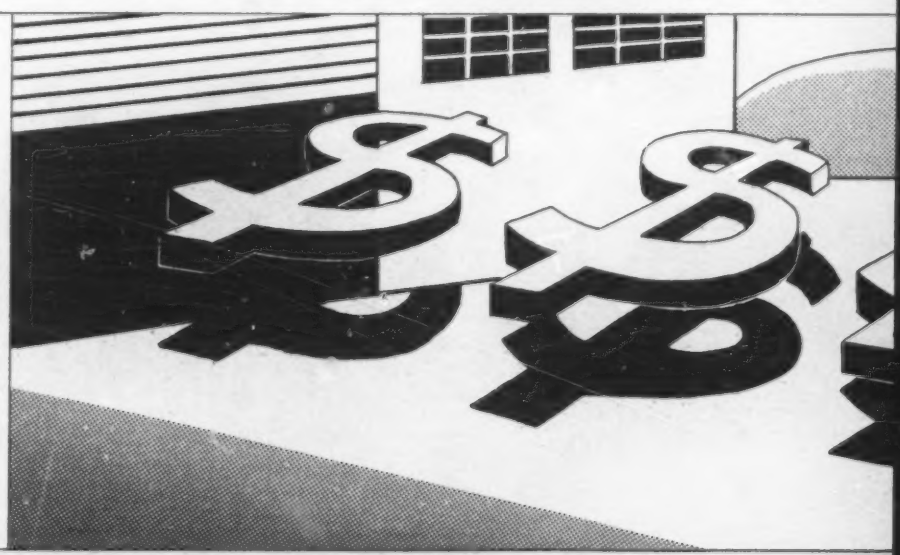
"And this is just primitive automation. When material gets rejected 20 steps before it is being used because the computer knows it won't fit, people are going to react in a predictable fashion," he continues.

When craftsmen made individual products, they had a pride in their work, a direct pride in the product of their craft. Already our industrial society has diminished individual pride by making products that represent the work of many people. And it shows.

If we take this a step further and introduce computer-assisted equipment between the worker and his job function, pride of workmanship takes another beating.

This is one of many problems which

The race to the automated factory pays off in economic growth, better and more competitive products and a higher standard of living for all.



must be overcome. Workers, at all levels, must feel secure in their jobs, they must develop an appreciation for the economic advantages of automation and learn to use it effectively without fear or resentment. And, American industry must be willing to acknowledge that craftsmanship can be found in the synergistic combination of human and computer.

Implementation of factory automation requires many years of co-existence and co-operation between man and machines.

Can today's workforce meet the challenge of tomorrow's factory? "This is the most difficult question that industrial managers are going to have to face as they introduce new technology throughout the rest of the decade," says Dr. O'Toole.

"Right now the assumption on the part of many managers seems to be, 'The people who are production workers are a bunch of dummies. They can't deal with these new technologies. We'll fire them and hire their kids who have been to college or have had some experience with these new technologies in their high schools.' "

Naturally, there is resistance to this idea from unions and workers. But the only way people who are displaced can be retrained is if there is commitment on the part of unions to bargain for it, if managers see the value of retraining and if they have the tools to do it effectively.

At General Motors, for example, the company has taken the Plato system developed by Control Data Corp. and used it to teach former assembly line workers to be robot operators. GM has taught workers how to install, repair, maintain and monitor the new technologies that are being introduced, says Dr. O'Toole.

"What this example shows is that a great number of people with relatively little education can learn if they have access to these training methods that are very much individualized, in which a person can go at his or her own pace."

More manufacturers must introduce major retraining programs. And, existing jobs will have to be restructured with the intention of creating an atmosphere of co-existence between man and machine, according to results of the Venture Development study.

"Without retraining and job restructuring to enable labor to move to supervisory and machine-operating roles, the risk of worker alienation is high. Such alienation would not nurture factory automation, whose implementation is both evolutionary and lengthy, requiring many years of co-existence between workers and machines," says the report.

Beyond the technical training required to help workers adjust to new technology is the personnel training to help people adjust to each other in the changed work environment.

The introduction of new technology changes the social environment that existed. It changes the way people relate to each other and to the organization.

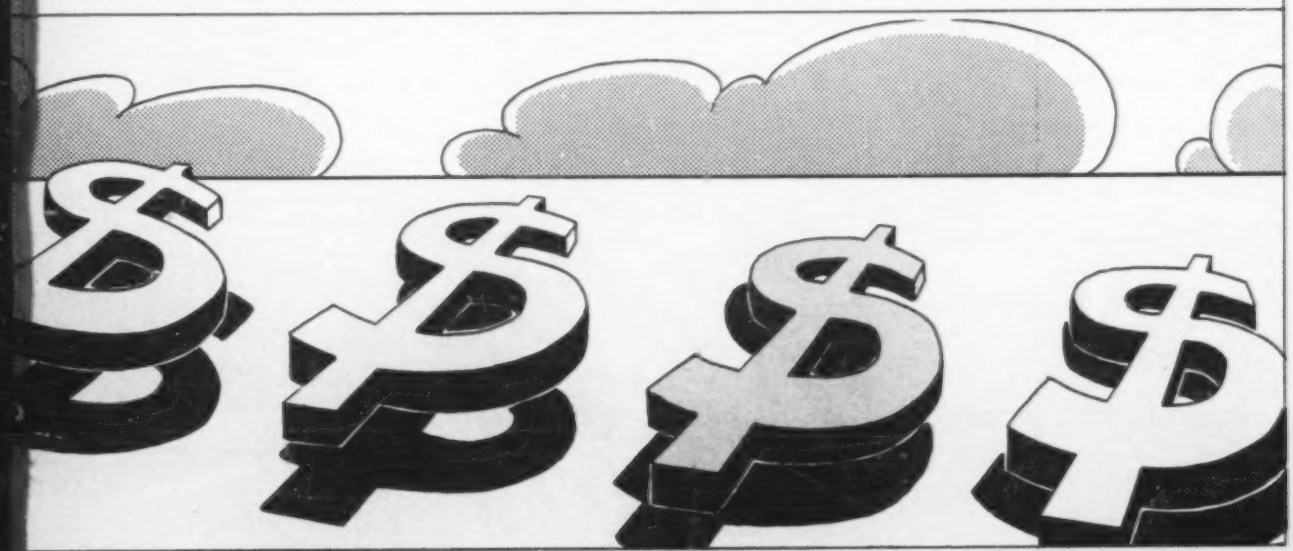
The philosphy grew up in the late 1940s, according to Dr. O'Toole that when you introduce technological change, you should also introduce compatible social change in the organization or else you don't get the full benefit of the technology. It might, indeed, turn out to be counterproductive if it so distorts the social relationships as to make the whole system less productive."

In many cases, a worker now will have access to a computer terminal. That terminal gives him or her access to a lot of information, more than he had before the automated device was installed. The information, which once was the purview of the supervisor is now available to the shop floor worker. What does that do to his relationship to the supervisor who once was important because of the information he possessed?

Well, for sure, it changes the relationships. And it takes a lot of retraining for both worker and supervisor in this new situation.

As Vernon Estes, manager, Robot Applications for General Electric Co. says, "The supervisor in tomorrow's factories will have to motivate rather than dictate. There's no room for Steinbrenners here." As to managing the managers under increased automation, these people must be given a free reign and minimal direction, adds Mr. Estes.

All this is quite a change from what had existed. Workers and foremen meet in a whole new relationship, more as partners than before. No longer are there two classes of workers—those who think and those who do. This new workplace may be harder for the foreman to adjust to than the workers.



The new foreman must be more diverse, says Mr. Estes. He must function as a consultant to the worker to show him what to expect from new equipment. The new foreman is freed of the thankless task of searching out materials and tools. These things are available automatically.

"What we really need is manufacturing engineering type talent," says Mr. Estes. This isn't always available from an academic background. But often is available from people who have worked in factories for a long time. We can take that talent, those people and retrain them, adds the GE executive.

"And, don't knock the older employees," comments Mr. Estes. "Some of them are our best technologists these days. Some of them have less fear of change than the young people coming along. I don't think acceptance of technology relates to age as much as it does to motivation."

There is something to be said for the young however. Through no particular merit of theirs, the younger generation have grown up expecting computers to do the things older people were surprised to see. They are just more comfortable with this type technology and theirs will be the generation that will move that technology from the minimal acceptance it has today to total acceptance in the future.

The third industrial revolution, as some call it, will be controlled by computers, servo mechanisms, adaptive controls, says Mr. Estes.

Training will help the current workforce be a part of that revolution. "It is not an impossible thing to deal with. I can take a good auto mechanic or a good farm boy and make him a good field service man. It takes common sense, enthusiasm and a willingness to work. These fundamentals don't change," adds Mr. Estes.

One plant, the Bingham-Willamette Co. in Portland, Ore. and Shreveport, La. has recently entered the computer age. Workers are using computer terminals located right on the shop floor to enter their daily time and attendance data as well as details about the jobs they perform.

"Although employees have minimal interaction with the terminals, they must understand the reason the system is here and how it works for their benefit as well as that of the company," says Don Price, B-W's plant manager.

"Management, supervisors and union employee representatives were trained to use the system initially and three workstation groups were selected at 'test' sites," says Mr. Price.

Mr. Price says that the production employees have responded positively to the new system. "The main thing that matters to them is the standards by which they are judged. We have not changed those standards, if anything, they've become more objective with an automated system."

Many of the workers also like working around computers. It took them time to adjust to the terminals, but now they feel proud to be associated with advanced technology, which helps bring more esteem to their work. They also appreciate the security of the system, knowing that no one else can tamper with their labor reporting data.

Every employee who uses the system receives a fold-out card that explains how the terminals operate and steps through the procedure to be followed for each of the ten time reporting transactions. In addition, a comprehensive users manual is located near every terminal and quick-reference posters hang on the walls nearby.

One of the system's many reports summarizes employee transactions for the week; it helps call attention to excessive error transactions.

"Supervisors review the report and spend extra time with those workers who are having problems," says Mr. Price. "So far in Portland, the error rate has been quite low, ranging between one and three percent.

Clearly, retraining can be effective. Success depends in large part on the commitment of the company.

This industrial revolution will be controlled by computers, servo mechanisms and adaptive control. Education is the key to success.

Retraining is so much discussed today, it would seem as if there were no progress to report. That is not the case. Initiatives taken so far are ambitious.

Ford and General Motors, in cooperation with the United Auto Workers,

Training takes the fear out of the future and creates a better work environment for both workers and managers.

have launched programs to retrain laid-off workers for new jobs, both in the auto industry and in other growth industries, aerospace and electronics.

These and other active programs were recently reported by the Work in America Institute, Inc.

The Federal Government's new job training act, which relies heavily on private-sector participation to carry-out its goals, has been expanded to include the retraining needs of displaced workers who have little chance of returning to their jobs.

California's Plant Closure Response Unit mobilizes community, labor and company resources in order to develop reemployment programs in the event of plant shutdowns. When General Electric's flat-iron plant closed, electrical assembly-line workers were enrolled in classes to upgrade their skills in electrical assembly and to learn new skills in word processing, according to the Work in America Institute.

And, more and more "business-school partnerships" are emerging in which companies and schools share equipment, facilities and personnel. Student trainees are taught state-of-the-art computer techniques needed for specific job openings, the Institute reports.

Individual companies are also concerned with training and retraining their own people. With all of the changes in business brought about by foreign competition, the introduction of new manufacturing methods such as robotics and office automation, planning for a company's human resources will be a critical factor in determining business success.

Honeywell, Inc., for example, has convened a task force to provide guidance on the issues of office and factory automation.

The task force on factory automation, as part of its study, interviewed 15 major U.S. industrial corporations relative to their policies associated with the use of new manufacturing technology, says Dr. Arnold F. Kanarick, Honeywell's vice president for human resources.

The results of these interviews are interesting. They are:

"Only one company had a 'no-staff reduction' policy relating to increased factory automation.

"Only one company has an active practice of human resource assessment when it comes to authorizing funds for automation equipment.

"Five companies tend to 'protect' office personnel better than factory personnel when it comes to job dislocation.

"Almost all companies state that they expect to 'manage' personnel impacts to a minimum by using normal attrition to balance staff reductions warranted by increased automation.

"Strong hire/fire practices generally parallel union relationships, i.e, management excuses strident practices on the basis of contract obligations.

"No company had a recognized guideline or implementation process for effectively minimizing the human resource impacts of future factory or office automation," according to Dr. Kanarick.

Complete results of the task force work are not yet available, but Honeywell already has several employee training programs operating.

One such, the Modern Technology Concepts program gives selected technical managers and scientists mini-courses on key topics, including solid-state devices, microprocessors, polymers, optical systems and computer graphics. These courses are presented by both University of Minnesota faculty and Honeywell senior scientists. Through this program engineering managers can upgrade their own technical knowledge.

As important, The Honeywell Engineering Management School has been created to sustain personnel effectiveness. This course, also taught by faculty from the University of Minnesota is designed to broaden the people handling capabilities of technical managers.

"Management of stress, coaching, employee counseling, teamwork, listening and career planning are practical skills that mid-career managers need to deal with today's heterogeneous workforce," comments Dr. Kanarick.

Training inside and outside companies is helping to minimize some of the problems the factory of the future concept may create. And to some extent, much has been done already.

Management Science America, (MSA) Inc., Atlanta, Ga., a leading manufacturing software firm, spent 50,000 days of education with its customers last year. These training courses are offered to a range of levels in customer companies.

"We recognize that developing the product is half of our job," says Ray L. Dicasali, vice president of MSA. "We

also have to get it to the customer's environment and we have to educate people, not just a few either. We do a lot of education because there are a lot of people in any company that are going to have to understand what is the problem and what is the solution."

"Manufacturing has been especially attuned to this issue for some years," says Mr. Dicasali.

And, Mr. Dicasali is positive about the future. He feels that over the past several years both managers and staff of customer companies are less intimidated by technology than before.

Individuals in customer companies are more willing to take responsibility for the new technology, and manage the new technology so that it doesn't disrupt the business.

Pete Link of Link and Associates, management consulting firm based in Arlington, Texas, is also optimistic about the future. "Technology will be implemented at a slow enough pace to smooth the transition for most companies. There will be automation introduced, robotics and flexible manufacturing systems, but we won't see an integrated factory for a long time. Today's kids are going to be in the workforce before we get to the factory of the future," he says.

"I heard the same scare talk when numerical control was introduced in the '60s. It hasn't cost jobs. Attrition will take care of most of the problems. And the young people entering the job market will adjust easily to the new environment."

Training is paramount, though, states Mr. Link, and companies are beginning to realize this and initiate training programs.

One interesting theory proposed by Sperry Univac's Mr. Vollum is that factory work had never been considered a glamour job until recently. Now it is attracting the brightest, most capable graduates.

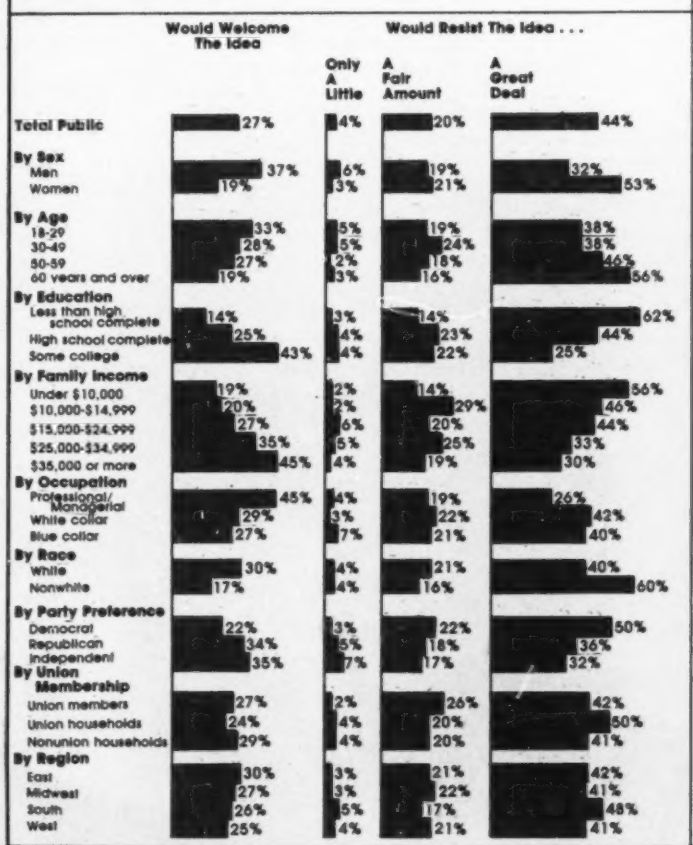
"The level of interest in manufacturing is high; the dedication of the new employees in the factory is going to be high. Factory work is not going to be boring, as it was once characterized."

Shop level workers in the new factory will have to learn how to maintain and run computer-controlled machinery. The skilled apprenticeship programs which trained people for factory work will be supplanted by trade school programs, says Mr. Vollum.

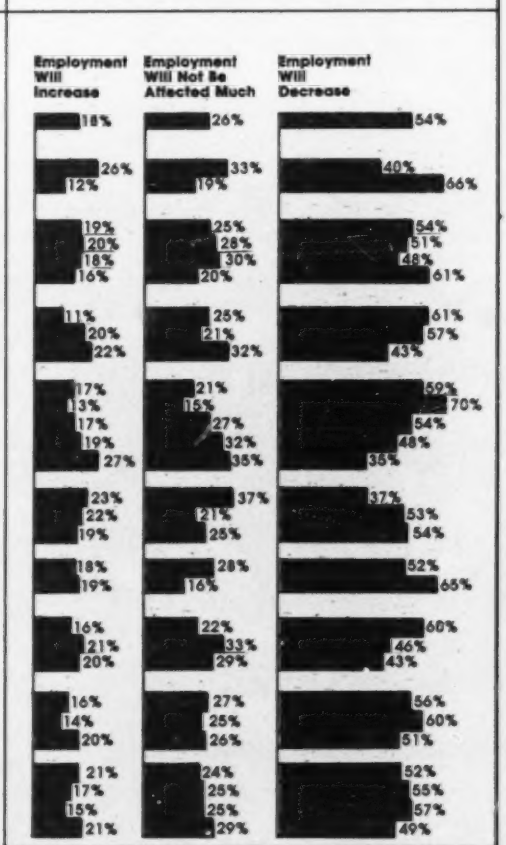
The Sperry Univac executive believes the aerospace and automotive industries will lead in the implementation of automation. (Cont. on p. 56)

Fear and Resistance Mark the Public's View of Automation

Acceptance of a significant increase in the use of robots and automated work procedures

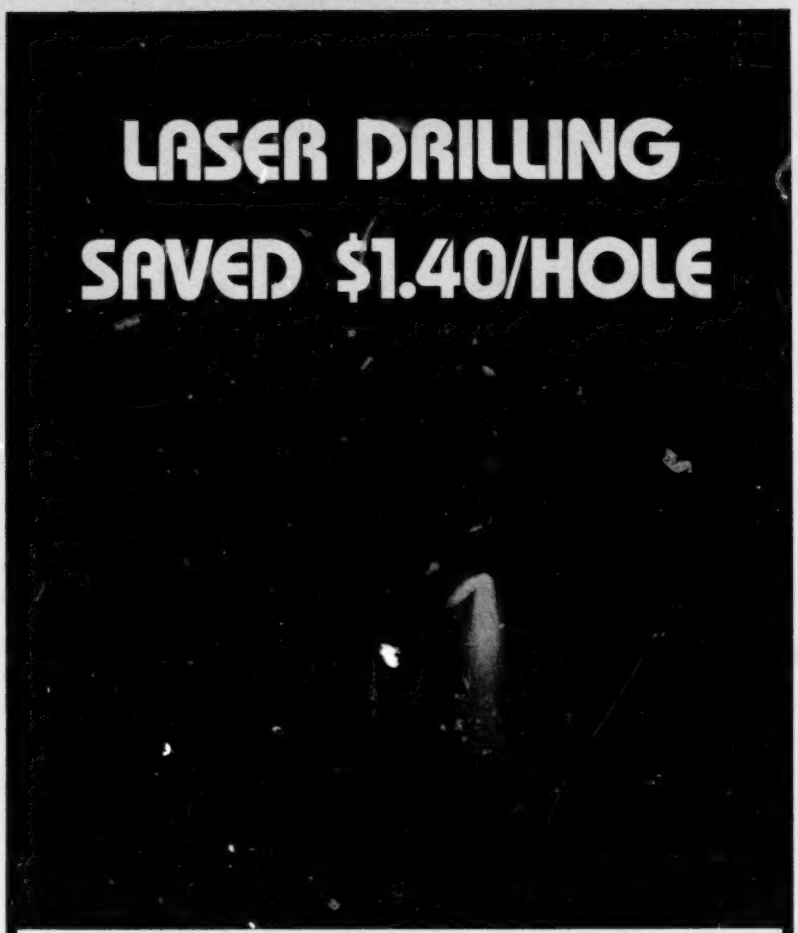


Long-term effect on U.S. employment if the use of automation (robots and automated work procedures) increases significantly.



Notes: These statistics are part of the findings of a Public Opinion Survey conducted by Opinion Research Corp., Princeton, N.J. Results are based on telephone interviews with a national probability sample of 1005 persons.
"Don't know" responses omitted.

LASER DRILLING SAVED $1.40/HOLE



What would you say it costs to drill a 0.060-in.-thick diameter lubrication hole through the 0.375-in.-thick wall of an internal gear made of hot-forged, powder-metal 4662 alloy (Rockwell "C" 60)? A major manufacturer reports the answer is $1.50 per hole using conventional techniques. Why so expensive? Because the carbide tipped drills used dulled after six to eight holes and had to be replaced.

By trepanning the hole with a CLC Series 400 Pulsed Nd:YAG Laser, the cost has been reduced to 10¢ per hole — a $1.40 savings! But, what about production rates? The laser technique takes four seconds per hole which, including handling time, converts to 675 holes per hour.

If you want to know more about the laser way, contact the CLC sales office closest to you from the following:

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Chicago	815/399-2068	Orlando	305/851-2540	Toronto	416/298-8731

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METALWORKING'S MANUFACTURING SYSTEMS

It is in the economic interests of these industries to automate. And automation only makes sense if it is economically justified.

The smaller job shops will lag behind for the same reasons.

Mr. Vollum sees automation introduced gradually, but not gradually enough to prevent a terrible shock for a lot of workers.

And Dr. O'Toole believes that "If we don't come up with some very creative ways of retraining the 10 million or so people that are out of work today, we face the most serious challenge to our nation since the depression."

Workers, both union and non-union, who for years have been well paid, even over-paid, and have enjoyed the fruits of the American system, will find technological unemployment intolerable, he says.

These people may turn and undercut that very system and create enormous social problems. □

Metalworking's Manufacturing System: 37

Other articles in this series in 1982:

Training the Next Generation of Manufacturers, Jan. 22, pp. 62-65

Data Communications: Vital Link in a Manufacturing System, Feb. 19, pp. 75-79

Robots Extend a Helping Hand, March 19, pp. 59-63

PCs Provide Shop Floor Control With Boardroom Impact, April 23, pp. 94-98

Speech Technology: The Voice of Tomorrow's Factories? May 21, pp. 92-97

The Emerging Worldwide NC Race, June 25, pp. 59-64

Are Superminis Challenging The Mainframe Computers, July 23, pp. 57-65

Now, It Can Be Tested on The Terminal, Aug. 20, pp. 109-112

Is It Time for a New Approach to NC Programming?, Sept. 24, pp. 83-89

Are Factory Systems the Path to Productivity?, Oct. 22, pp. 41-48

Will Turnkey CAD/CAM Systems Remain Viable?, Nov. 19, pp. 49-56

Guidelines for Buying a Personal Computer, Dec. 15, pp. 49-53

In 1983:

Air Force ICAM Project Paves the Way for the Factory of the Future, Jan. 21, pp. 48-55

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EFFECTIVE FEBRUARY 14, 1983

MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Steel Production, Composite Prices

(Effective February 14, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,373	1,358	7,851	10,652
Capability Utilization Rate	47.4	46.8	44.1	58.9

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	25.954	25.954	25.195
Pig Iron* * (Net ton= 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 67.50	$ 67.50	$ 61.50	$ 84.50
No. 2 bundles	$ 47.83	$ 47.83	$ 42.50	$ 56.50
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 69.50	$ 69.50	$ 62.50	$ 94.50
No. 1 steel, Philadelphia	61.50	61.50	59.50	75.50
No. 1 steel, Chicago	71.50	71.50	62.50	83.50
No. 1 bundles, Detroit	61.50	61.50	48.50	83.50
Low Phos., Youngstown	69.50	69.50	64.50	95.50
No. 1 mach'y cast., Pgh	66.50	66.50	61.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	113.50
No. 1 mach'y cast., Chi	109.50	109.50	106.50	126.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Nonferrous Prices

(Effective February 14, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	79.00-80.00	79.00	2/11/83
Lead	20.50-23.00	21.00-23.00	2/9/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	1/11/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.25-$1.40
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $500.50
Indium, dollars per troy oz..... $2.60-$2.85
Iridium, dollars per troy oz..... $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$335-$360
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz..... $14.53
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Feb. 7—577.55 Feb. 10—584.04
Feb. 8—579.67 Feb. 11—588.64
Feb. 9—581.52

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	75½	66¼
Yellow brass	64¼	59⅛
Red brass	69½	62⅝
Comm. bronze	71	64
Mang. bronze	62¾	61
Free cutting rod ends	52	51

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	67
No. 2 copper wire	59
Light copper	50

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	63
No. 2 copper wire	55
Light copper	46
No. 1 composition	51
No. 1 comp. turnings	48
Hvy. yellow brass solids	35
Hvy. yellow brass turnings	26
Radiators	42

Aluminum

New mixed clips	29	—30
Old sheet	27	—28
Old cast	27	—28
Clean dry borings	28	—29

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	25	—26
Mixed L.C. clips	22	—23
Old sheets and cast	17	—18
Borings and turnings	11	—12
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	53	—54
No. 2 copper wire	46	—47
Light copper	41	—42
Radiators	35	—36
No. 1 composition	42	—43
No. 1 composition turn'gs	40	—41
Cocks and faucets	31	—32
Clean heavy yellow brass	29	—30
Brass Pipe	29	—30
New soft brass clippings	40	—41

Lead

Heavy soft lead	10	—11
Whole batteries	4	— 5
Type metal	15	—16
Electrotype	17	—18

Nickel

Nickel solids	95	—100
Nickel rod ends	95	—100
Nickel sheets, clips	95	—100
Nickel turnings	45	— 50

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

EFFECTIVE FEBRUARY 14, 1983

MATERIALS NEWSFRONT

(Effective February 14, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	84.00 to	85.00
No. 1 factory bundles (auto)	83.00 to	84.00
No. 2 bundles	49.00 to	50.00
No. 1 busheling	79.00 to	80.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	84.00 to	85.00
Heavy turnings	59.00 to	60.00
No. 1 RR hvy. melting	76.00 to	77.00
Rails 2 ft. and under	85.00 to	86.00
Scrap rails, random lgth	80.50 to	81.50
RR specialties	78.00 to	79.00
No. 1 machinery cast	66.00 to	67.00
Cupola cast	59.00 to	60.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	465.00 to	475.00
18-8 turnings	365.00 to	375.00

Chicago

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	62.00 to	63.00
No. 1 dealer bundles	79.00 to	80.00
No. 1 factory bundles (auto)	79.00 to	80.00
No. 2 dealer bundles	49.00 to	50.00
No. 1 busheling	78.00 to	79.00
Shredder scrap	78.00 to	79.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	36.00 to	37.00
Low phos. forge crop	87.00 to	88.00
Low phos. punchings plate ¼ in. and heavier	92.00 to	93.00
Low phos. 2 ft. and under	87.00 to	88.00
No. 1 RR hvy. melting	77.00 to	78.00
Scrap rails, random lgth	69.00 to	70.00
Reroller rails	95.00 to	96.00
Rails, 2 ft. and under	89.00 to	90.00
RR couplers and knuckles	79.00 to	80.00
RR car axles	104.00 to	105.00
No. 1 machinery cast	109.00 to	110.00
Cupola cast	94.00 to	95.00
Stove plate	88.00 to	89.00
Steel car wheels	79.00 to	80.00
Stainless		
18-8 bundles and solids	420.00 to	430.00
18-8 turnings	320.00 to	330.00
430 bundles and solids	95.00 to	100.00
430 turnings	70.00 to	75.00

Philadelphia

No. 1 hvy. melting	$ 60.00 to	$ 63.00
No. 2 hvy. melting	52.00 to	55.00
No. 1 dealer bundles	74.00 to	77.00
No. 2 dealer bundles	43.00 to	46.00
No. 1 busheling	74.00 to	77.00
Shredder scrap	72.00 to	75.00
Machine shop turn.	20.00 to	23.00
Mixed bor. and turn.	20.00 to	23.00
Shoveling turnings	35.00 to	38.00
Low phos. 5 ft. and under	72.00 to	75.00
Low phos. 2 ft. punchings	87.00 to	90.00
Electric furnace bundles	86.00 to	89.00
RR specialties	76.00 to	79.00
Rails, 2 ft. and under	89.00 to	92.00
Cupola cast	56.00 to	59.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 48.00 to	$ 49.00
No. 2 hvy. melting	46.00 to	47.00
No. 1 dealer bundles	61.00 to	62.00
No. 2 bundles	27.00 to	28.00
No. 1 busheling	60.00 to	61.00
Drop forge flashings	37.00 to	38.00
Machine shop turn.	22.00 to	23.00
Mixed borings and turn.	11.00 to	12.00
Shoveling turnings	22.00 to	23.00
Cast iron borings	10.00 to	11.00
Heavy breakable cast	29.00 to	30.00
Mixed cupola cast	45.00 to	46.00
Automobile cast	65.00 to	66.00
Stainless		
18-8 bundles and solids	355.00 to	365.00
18-8 turnings	235.00 to	245.00
430 bundles and solids	85.00 to	95.00

Youngstown

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	76.00 to	77.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	69.00 to	70.00
Electric furnace bundles	75.00 to	76.00
Galvanized bundles	65.00 to	66.00

Cleveland

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	72.00 to	73.00
No. 1 factory bundles	81.00 to	82.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	72.00 to	73.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	95.00 to	96.00
Low phos. punchings plate	95.00 to	96.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	99.00 to	100.00
Rails, 18 in. and under	100.00 to	101.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	89.00 to	90.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	275.00 to	285.00
18-8 turnings	225.00 to	235.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 27.00 to	$ 28.00
No. 2 hvy. melting	17.00 to	18.00
No. 1 busheling	32.00 to	33.00
No. 1 dealer bundles	30.00 to	31.00
No. 2 bundles	14.00 to	15.00
Machine shop turn.	3.00 to	4.00
Mixed bor. and turn.	10.00 to	11.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	9.00 to	10.00
Low phos. plate	50.00 to	51.00
Structural and plate, 2 ft. and under	48.00 to	49.00
Rails, 2 ft. and under	44.00 to	45.00
Scrap rails, random lgth	24.00 to	25.00
No. 1 machinery cast	65.00 to	66.00
No. 1 cupola cast	42.00 to	43.00

St. Louis

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	50.00 to	51.00
Foundry steel, 2 ft.	50.00 to	51.00
No. 1 dealer bundles	58.00 to	59.00
No. 2 bundles	47.00 to	48.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	58.00 to	59.00
Rails, random length	49.00 to	50.00
Rails, 18 in. and under	64.00 to	65.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 56.00 to	$ 57.00
No. 2 heavy melting	52.00 to	53.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	40.00 to	41.00
No. 1 busheling	54.00 to	55.00
Shredder scrap	71.00 to	72.00
Machine shop. turn.	18.00 to	19.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	53.00 to	54.00
Elec. furnace, 3 ft. & under	50.00 to	51.00
Structural and plate, 2 ft.	70.00 to	71.00
Structural and plate, 4 ft.	69.00 to	70.00
No. 1 RR hvy. melting	55.00 to	56.00
Scrap rails, random lgth	57.00 to	58.00
Rails, 18 in. and under	74.00 to	75.00
Angles and splice bars	67.00 to	68.00
No. 1 cupola cast	74.00 to	75.00
Unstripped motor blocks	52.00 to	53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 46.00 to	$ 47.00
No. 2 hvy. melting	45.00 to	46.00
No. 1 dealer bundles	47.00 to	48.00
No. 2 bundles	26.00 to	27.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	7.00 to	8.00
Cast iron borings	8.00 to	9.00
Low phos. 18 in. and under	73.00 to	74.00
Rails, random length	55.00 to	56.00
Rails, 2 ft. and under	77.00 to	78.00
No. 1 cupola cast	60.00 to	61.00
Heavy breakable cast	24.00 to	25.00
Drop broken cast	64.00 to	65.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 29.00 to	$ 30.00
No. 2 hvy. melting	25.00 to	27.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	385.00 to	410.00
18-8 turnings	280.00 to	300.00
430 prepared solids	70.00 to	80.00
[illegible]	60.00 to	70.00

[illegible]ton

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 32.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	25.00
No. 1 dealer bundles	37.00 to	39.00
No. 2 bundles	20.00 to	22.00
No. 1 busheling	37.00 to	39.00
Shredder scrap	38.00 to	40.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	1.00 to	2.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	23.00 to	25.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	27.00 to	29.00
No. 1 dealer bundles	25.00 to	27.00
No. 2 dealer bundles	8.00 to	10.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 55.00 to	$ 57.00
No. 2 hvy. melting	44.00 to	46.00
No. 2 bundles	33.00 to	35.00
No. 1 cupola cast	90.00 to	92.00
Mixed yard cast	78.00 to	80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 38.00
No. 2 heavy melting cut 2 ft. and under	35.00
No. 1 dealer bundles	45.00
No. 2 bundles	5.00
Mixed steel scrap	22.00
Bush. new fact. prep'd.	43.00
Bush. new fact. unprp'd.	35.00
Machine shop turn.	20.00
Short steel turn.	23.00
Mixed bor. and turn.	12.00
Cast scrap	35.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	40.00 to	41.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	12.00 to	13.00
Crushed turnings	24.00 to	26.00
Shredder scrap	52.00 to	53.00
Cut structural plate 2 ft. and under	74.00 to	76.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	66.00

METALWORKING ORDER TRENDS

Now, price cooling threatens to turn into deflation

Disinflation was the name of the game in producer prices through much of 1981 and all of 1982.

As 1983 opened, the game had a new name: Deflation.

Prices of producer finished goods in January dropped 1.0 pct from the last month of 1982. The keeper of the price keys, the U.S. Labor Dept., noted that the January decrease was the steepest since its price index was first calculated in 1947.

Running right along with the downward price move in finished goods, were declines in tags on both intermediate goods and crude materials. The price route was a broad-based one.

Prices of metalworking goods didn't actually deflate in January, but they were close to the zero-change point. The average January price advance for the 22 key metalworking product lines listed on the table here came to 0.1 pct. If held for a year, that monthly average would result in an annual price rise rate of 1.2 pct.

Prices of capital equipment in January were down from December by 0.1 pct.

This was the third time over the 12-month period ending in January that capital equipment prices deflated.

January's strongest downward price push wasn't in metalworking. At the center of the deflation whirlpool was a 4.2 pct fall in energy prices.

This was also where the big price turnaround occurred. In contrast to the January 4.2 pct drop, energy prices had climbed an average 2 pct a month during the six months ended in November of last year.

The current squeeze on prices, of course, comes from recession-hit market demand that has turned the U.S. industrial landscape into a virtual wasteland of idle plants. As one metalworking executive explains, companies make price concessions on their products "to make some sales and get some money in to pay the heating and lighting bills at their plants."

Things may not be that desperate, the general idea seems to be on target.

Tags on metalworking goods aren't yet stamped 'deflationary,' but many are getting close to that point. But deflation doesn't seem likely at hand—at least, not on any sustained basis. That's because budding signs of recovery in the consumer sector foreshadows stronger market demand soon for industrial goods lines.

Latest Month Covered: January, 1983

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	373.8	+ 0.3	+ 3.5
Metal Forming Machine Tools	413.1	+ 0.3	+ 4.5
Agricultural Machinery & Equip.	321.4	+ 0.5	+ 6.0
Construction Machinery & Equip.	348.6	+ 0.2	+ 3.4
Industrial Process Furnace & Ovens	357.0	+ 0.2	+ 4.6
Industrial Material Handling Equip.	286.6	− 0.1	0
Pumps, Compressors & Allied Equip.	349.6	+ 0.4	+ 2.3
Fluid Power Equip. (Dec. 1970 = 100)	248.9	0	+ 4.9
Mechanical Power Transmission Equip.	312.9	+ 0.3	+ 1.3
Automobiles	218.8	0	+ 1.6
Motor Trucks—Light	275.3	0	+ 1.3
Motor Trucks—Heavy	317.5	0	+ 6.8
Railroad Equipment	357.6	0	+ 3.4
Fabricated Metal Structural Products	303.3	− 0.4	0
Electric Motors	298.8	0	+ 2.6
Valves (Metal, Ex-Fluid Power—Dec. 1982=100)	100.3	+ 0.3	NA
Ball & Roller Bearings	330.9	− 1.3	+ 2.8
Cutting Tools & Accessories	272.2	0	+ 2.7
Heating Equipment	240.1	+ 0.3	+ 2.9
Plumbing Fixtures & Brass Fittings	280.6	+ 0.5	+ 2.2
Metal Containers	327.0	+ 0.4	+ 0.8
Miscellaneous Metal Products	288.6	0	+ 2.6

Data based on U.S. Labor Dept.'s Producer Price Index

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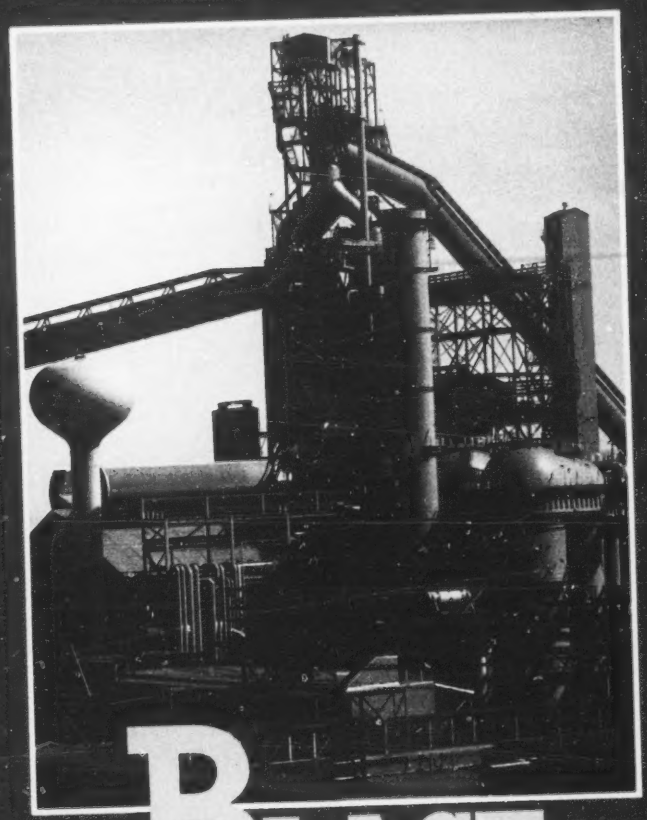
Chilton's

IRON AGE

THE MAGAZINE FOR METAL PRODUCING MANAGEMENT

MARCH 7, 1983



BLAST FURNACE PERFORMANCE REPORT

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ALSO: 'NO-SLAG' STEELMAKING WAITING IN THE WINGS

VOL. 226, NO. 7

IRON AGE

MARCH 7, 1983

COVER STORY

MP-5 STEEL IMPROVES ITS BLAST FURNACE EFFICIENCY
There may be fewer and fewer blast furnaces on the American steelmaking scene these days, but the industry has learned to get more iron from those remaining furnaces.

FEATURES

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The man at the wheel of the nation's largest automaker talks about changes GM is undergoing—its joint venture with Toyota, a new concept in auto production and capital spending plans.

24 VACUUM HEAT TREATING EMERGES FROM ITS OWN VACUUM
Vacuum furnaces, noted for their ability to handle "special problems," now vie with atmosphere furnaces on a cost basis.

MP-21 NO-SLAG STEELMAKING STILL WAITING IN THE WINGS
Although the Japanese are giving attention to the concept, it doesn't seem to be catching on in the U.S. mills.

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Domestic steelmakers are refiling their trade complaint against Japanese steel imports.

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It's taken nearly 15 years, but Lockheed has finally written off the ill-fated Tristar L-1011 in its financial reporting.

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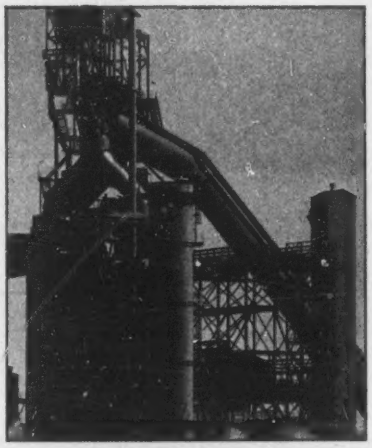
Bendix is convinced the combined virtues of its new Quadrax machine will change the way Americans measure parts.

33 PRODUCTS NEWSFRONT
Industrial furnaces will be getting better servicing, thanks to Babcock & Wilcox' new insulating foam technology.

37 MATERIALS NEWSFRONT
There are signs that steel's recovery is underway. March shipments will be highest in a year.

44 BUSINESS FORECAST
There was just one shining economic victory in 1982. Inflation cooled dramatically, but at a high cost in unemployed workers.

MP-2 METALWORKING NEWSFRONT
Chinese steelmakers say the controversial Wuhan steel mill is operational and saving their nation money on steel imports.



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The truth about capital spending

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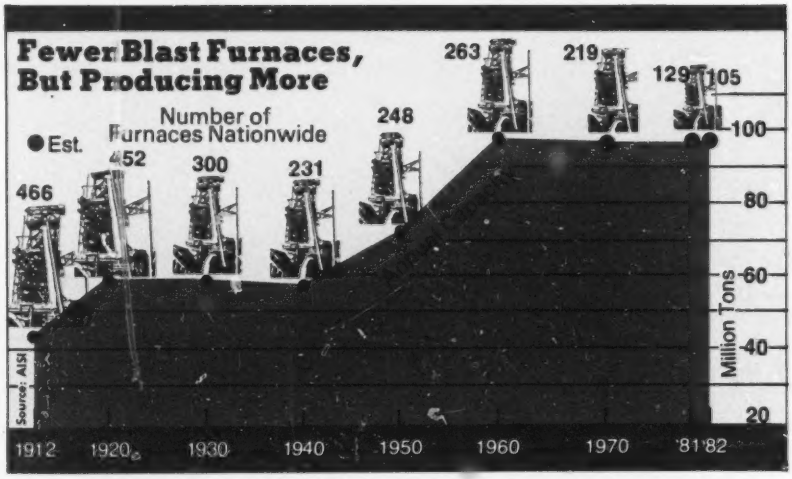
STEEL IMPROVES ITS BLAST FURNACE EFFICIENCY

American steelmakers may be cutting back the number, but they are getting more iron from the remaining furnaces.

BY GEORGE J. MCMANUS



Is the North American blast furnace an endangered species?

In places like Lackawanna, N.Y., Johnstown, Pa., and Fontana, Calif., blast furnaces are no longer found or won't be shortly. The last blast furnaces in the city of Pittsburgh are being torn down.

There is no question the big iron furnace faces an increasingly harsh environment across the continent. This is partly due to the depressed state of the steel industry. It is also due to competition from the electric furnace and scrap. Finally, the relatively small North American species must compete with much larger furnaces abroad.

If history is any guide, however, the efficiency of the blast furnace will increase faster than people are tearing furnaces down. At any rate, attrition will be far less than a head count of the remaining furnaces would indicate.

That has been the pattern. During the Depression of the '30s, 70 blast furnaces were scrapped. At the end of the decade, there was more blast furnace capacity—56 million tons—than at the start.

In 1960, there were 263 blast furnaces in the U.S. These could produce 96 million tons. By 1981, the number of furnaces was down to 129, but ironmaking capacity was about the same as in 1960.

According to unofficial estimates, there are now 105 blast furnaces standing. One authority says only about 60 of these will ever be operated again. Only 35 were actually operating in January of this year.

The recent reductions probably reflect some contraction of the whole steel industry, but again, they also reflect the fact that the same amount of iron can be produced by fewer furnaces.

"What we could produce on four furnaces in 1960 we can produce now on two furnaces," says E. J. Ostrowski, director, quality assurance and technology, National Steel Corp.

If you take today's biggest and best blast furnaces, the effect of technical change is even more dramatic. In 1960, the average U.S. blast furnace could turn out a little over 1,000 tons a day. The new L furnace at the Sparrows Point plant of Bethlehem Steel Corp. has produced over 8,000 tons a day. The No. 7 furnace of Inland Steel is built for the same kind of production.

Some of the things that have been done and are being done are outlined by Mr. Ostrowski. He cites: "Increased hot blast temperatures with fuel injection; improvement in the quality of sinter—we learned how to make basicity sinter that had integrity and cleanliness.

"The use of pellets substituted for coarse ore; improvements in coal quality and coke quality; understanding and beginning to control burden distribution; oxygen enrichment and for a very few furnaces, high top pressure."

Some engineers see a technical plateau ahead for domestic blast furnaces. The acid pellets now being charged do impose temperature ceilings on furnaces. However, operators feel that bridge will be crossed in due time.

Meanwhile, there are all kinds of opportunities for upgrading existing furnaces. Most of the improvements will have to come on existing furnaces because no one is rushing out to build new blast furnaces these days.

Operators are confident they can meet this challenge. "In our case, what we're trying to do is develop our small furnaces to a world standard," says J. E. Holditch, superintendent of blast furnaces for Dofasco, Inc.

"It is our belief," says Mr. Holditch, "that through continuous upgrading of the small furnaces, they can be every bit as efficient as the large furnaces—in terms of fuel rates and in terms of dollars per ton."

One way to upgrade any furnace is to

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(Cont. from p. MP-5)

install a Koppers-Wurth bell-less top. The new Inland and Bethlehem furnaces have this top but the only older U.S. furnace to be equipped with it is at the Warren, Ohio, plant of Republic Steel Corp.

A look at the Warren project explains why there hasn't been more action. "Basically, we tore the top of the furnace right off, right down to the top of the columns," says J. Fischley, coordinating chairman of primary operations for Republic. "When you looked at that furnace right after it was torn down, all you could see was a couple of columns.

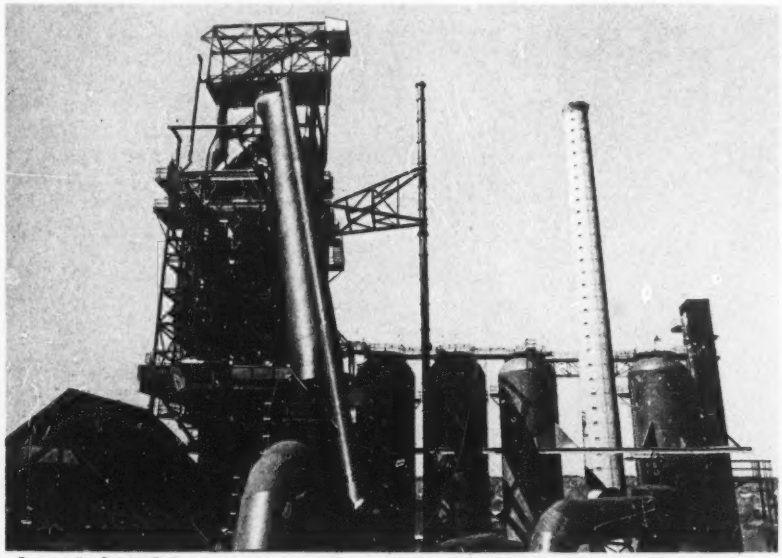
"Of course, the bosh comes out so we put up a new stack. Before we even started to put that stack up, we had to reinforce the hearth. And all the paraphenalia on top—the uptakes, the downcomers, and all the structure on top of the frame. So we did what I would consider a rather unique job of it."

With the new top, Republic could expect higher production. To accommodate this, the company put in a second iron notch and two new cast houses. For a further production increase, Republic installed two new stoves of its own "maxi-stove" design.

Republic went to all this trouble for a variety of reasons. The bell-less top is equipped with a rotating spout which permits precise distribution of the burden. By itself, this gives significant fuel savings.

"They're anywhere in the range of 45 to 55 lbs of coke as a direct benefit," says A. J. Dzermejko, manager of the metallurgical project section at Koppers Co., Inc. "And in addition, there's a 10 to 12 pct production increase just by putting this hardware on the furnace." Licensed by Paul Wurth of Germany, Koppers supplied all three of the American bell-less systems plus one to Fundidora in Mexico.

Another advantage of the bell-less system is that it provides a seal that stands up under high top pressure. Ten or 20 years ago, 5 psi would have been considered high pressure. The Warren furnace, with the bell-less top—can go to 15 psi. The Sparrows Point and Inland furnaces can go to 35 psi.



Republic Steel Corp. is one steelmaker getting more output from its existing blast furnaces. It relined and modified the furnace at its Warren, Ohio, plant during 1980 and 1981 and boosted the furnace's daily iron capacity from 2,800 tons to 3,400 tons.

All of which translates into greater efficiency and faster production. The 28-ft Warren blast furnace, which was originally built in the '30s, was producing around 2,800 tons a day before the rebuild. Republic is shooting for 3,400 tons a day now. The market slowdown has prevented a full test, but the company says the furnace is performing as expected.

As has been indicated, production of 3,400 tons a day can create a bottleneck in an older furnace. "We felt we needed a second tap hole to reach that level," says Mr. Fischley. "It's kind of a rule of thumb in the industry that furnaces of this size can get by with a single tap hole below 3,000 tons a day. But when you get up into the 3,000-to-3,400 range, it's much better to have a second tap hole."

As this suggests, one thing can lead to another when you start monkeying around with a blast furnace. With steel companies strapped for cash, suppliers are looking for ways to scale down the cost.

"If you haven't got the money now, do it bit by bit," says Ian MacLaren, executive vice president, Bailey-Hoogovens Co. The Sparrows Point L furnace has stoves of the Hoogovens design. Bailey Hoogovens has been involved in upgrading furnaces at Dofasco, Stelco, Inc., and other mills.

"First thing is to get the stove right, the lining correct," says Mr. MacLaren. "We hope that the linings will remain there for 20-25 years. Control systems, injection systems, burner changes can be made at a later date."

Much the same advice comes from N. B. Browne, sales manager for Bischoff Environmental Systems. Bischoff scrubbers are used on some 60 foreign blast furnaces. In this country, they have been installed on the new Bethlehem and Inland furnaces. Advantages cited include compactness, relatively quiet operation and the ability to control high top pressures.

"There's a whole new concept," says Mr. Browne. "Our whole big scrubber with all this nice stuff and instrument control is not always needed. In a relined blast furnace, where they're just upgrading blast cleaning equipment, they may not want a whole new scrubber. So now we're offering different components of our scrubber to accomplish different objectives."

A good example of systematic, step-by-step upgrading is at the Hamilton, Ont., plant of Dofasco. There are three 21-ft blast furnaces at Hamilton and one 28-ft furnace.

"Back in the early '70s," says Mr. Holditch of Dofasco, "we couldn't smelt as much iron as we wanted to. We set about doing a bunch of things, including external desulfurization, working with our mines to improve pellet properties, working with our coke plant to improve the quality of the coke.

"We got to the point where we could smelt more iron than we could cast," continues Mr. Holditch. "On our last reline of the small furnaces, we put in iron notches. We probably have the three smallest two-tap-hole furnaces in the world.

"Now, we can smelt more iron and cast more iron than the lower stack and bosh cooling system can support. We have to pace ourselves until we get to the next set of relines and we can upgrade the cooling system." Mr. Holditch feels the use of silicon carbide refractories is tied to improved cooling. "The two go hand in hand," he says.

"Once we have the cooling system upgraded and by that time, hopefully, we will have improved the high temperature properties of the pellets, then our operation will support a higher flame temperature than what our stoves are capable of giving.

(Cont. on p. MP-10)

"At that time, we'll be looking at upgrading the stoves." The upgrading will have to take in all the ancillary equipment, Mr. Holditch notes.

Dofasco has installed a bell-less top on its 28-ft furnace. "That furnace can produce in the neighborhood of 4,000 tons a day if we use oxygen enrichment," says Mr. Holditch. "We are not operating with higher top pressure."

Dofasco is staying with a relatively low blast temperature—1,750°F—on the 28-ft furnace. Without the benefit of either added pressure or temperature and using a 100 pct pellet charge, the furnace can produce 10 to 12 pct more iron.

"Improving the burden distribution gives you better gas-solid contact," explains Mr. Holditch. "That decreases the fuel rate by a 4½ pct. A decrease in the fuel rate by 4½ automatically yields an increase in productivity of 4½ pct for the same wind rate.

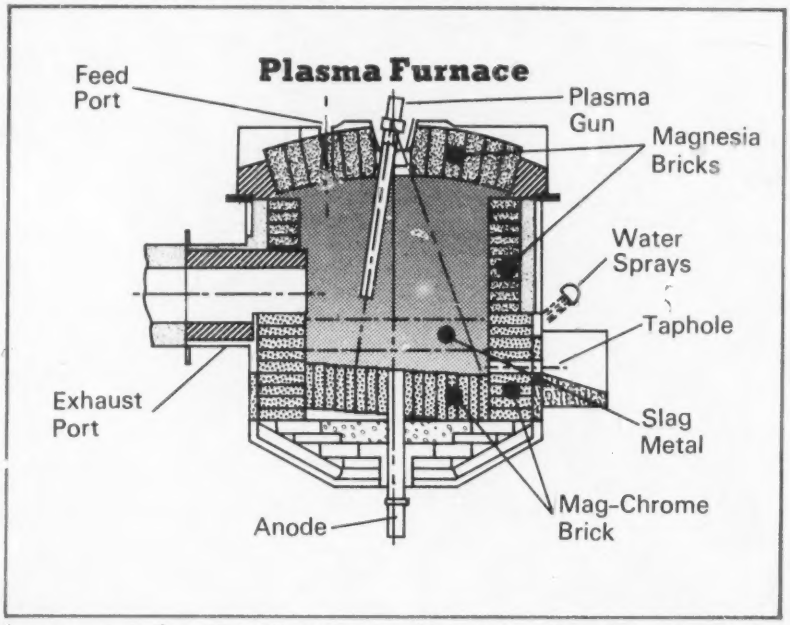
"Because of improved permeability, we were able to blow more wind and therefore received another 5½ pct in productivity."

Dofasco is supplementing its coke charge with 50 kgs of oil. In addition to conserving coke, oil has the effect of moderating flame temperatures. There was a general move away from oil when prices shot up and shortages developed a few years ago. The oil supply situation has eased for a while, but for the long pull, operators may find themselves restricted to coal-based fuels.

At Ashland, Ky., coal injections systems developed with Babcock & Wilcox have been installed on two Armco blast furnaces. In an AISE paper, Armco reported that the Ashland Amanda furnace was charged with 143 lbs of coal per ton of hot metal during 1981. In August 1981, the Armco injection technology was used by Nippon Steel Corp. to inject 115 lbs of coal per ton of iron at Oita Works.

Armco compares the cost of coal at $50 a ton with $120 a ton for coke and $200 for oil. Apart from the direct savings, coal has some effect in lowering flame temperatures, although not as much as oil.

Armco's Bellefonte furnace at Ashland has been equipped with a thicker lining and a Bischoff scrubber. Three of the four stoves have been rebuilt, using the Didier design. To improve burden distribution, an 18-in. skirt has been added to the big bell. From the mantle upward, 35 ft of stack shell plate provide greater cooling density.



Armco spent $19 million on these Bellefonte furnaces. Goals are reduced fuel consumption and a 5-million-ton campaign. At Middletown, Ohio, Armco is seeking better distribution through the use of Krupp adjustable armor.

"We've had varying experience," says A. P. Kerschbaum, manager of raw materials and ironmaking in Armco research. "There has been better experience with sinter than pellets." The round pellets tend to roll, explains Mr. Kerschbaum.

Bethlehem has been operating the Sparrows Point L furnace with a burden of half sinter and half pellets. The hot blast temperature runs around 2,250°F. The Hoogovens-type stoves on L furnaces could go higher, but Bethlehem is afraid of stress corrosion problems.

Equipped with the bell-less top, the L furnace has operated with top pressures of 25 to 27 psi. Bethlehem's two Burns Harbor furnaces, which are among the best in the country, have IHI tops and operate with top pressures around 16 or 17 psi.

The company is pleased with the bell-less top. "It lets you operate at a higher top pressure," says R. L. Warrick, blast furnace specialist in Bethlehem's engineering department. "It gives you some control of the distribution. That helps in the coke rate and in the campaign life. We'd love to put those things on all of our furnaces, but we're having trouble coming up with the money."

Monthly production with the L furnace has gone over 8,600 tons a day and over 9,000 tons have been turned out on individual days. The problem in the last year or so has been to keep production down to a rate that fits depressed market conditions.

"We've had to slow it down to the point where it's a hardship," says Mr. Warrick.

Bethlehem's general blast furnace program calls for reducing fuel rates, boosting productivity and improving availability. A big aim is to extend campaign life.

"What we're trying to do is improve the design of our cooling plates," says Mr. Warrick. "We're trying to get more water through the cooling plates and to reduce the pressure drop associated with the piping outside the furnace. We think we're headed in the right direction for solving the lower stack area of the furnace where we've had our campaign limitation."

Like Dofasco, Bethlehem feels better cooling is a requirement for using better refractories. "We have to have it for silicon carbide," says Mr. Warrick. "If we put the carbide in, we've got to improve the cooling."

Bethlehem's L furnace has a closed cooling system. At other locations of Bethlehem and others, the cooling systems are open. Some of the U.S. problems stem from the use of muddy river water, says O. G. Gramp, product manager of blast furnaces for Mannesmann Demag Corp.

Mr. Gramp notes that Mannesmann blast furnaces are cooled with treated boiler water in closed systems. Dense spacing of cooling plates also helps, he says. "All they have to do is add more plates." He notes that Mannesmann has had 8.5-million-ton campaigns.

At the Lake Erie plant of Stelco, Inc., operators have the task of operating a large, modern furnace at from 25 to 50 pct of capacity. Started in May 1980,

(Cont. on p. MP-15)

(Cont. from p. MP-10)

the Lake Erie furnace has a hearth diam of 33.9 ft. It has the Paul Wurth bell-less top and can operate with a top pressure of 15 psi. Stoves are of the Hoogovens design and can take blast temperatures well over 2,000°F.

Initial capacity of the Lake Erie blast furnace is between 3,500 and 4,000 tons a day. When all the support facilities have been installed, the furnace will be able to make 5,500 tons a day.

If the full amount of added iron were converted to finished steel, it would overload the Canadian market. Accordingly, Stelco designed the Lake Erie plant for incremental expansion. Output of the blast furnaces is limited by requirements of the steel shop and ultimately by the single strand slab caster.

"We've been running this furnace well below designed capacities ever since it started up," says Robert Milbourne, general superintendent of Lake Erie. Production has ranged from 1,800 tons of iron a day to 2,700 tons a day at present. "Hot blast temperatures would be in the range of 1,600 to 1,700°F.," says Mr. Milbourne. "We have a single iron notch," he adds.

The business of slowing a blast furnace to 25 to 50 pct of its potential takes some learning. "It's not difficult once you learn how," says Mr. Milbourne. "It doesn't look very efficient. You don't get very good coke rates. You get higher silicon hot metal and you tend to run at higher slag volumes.

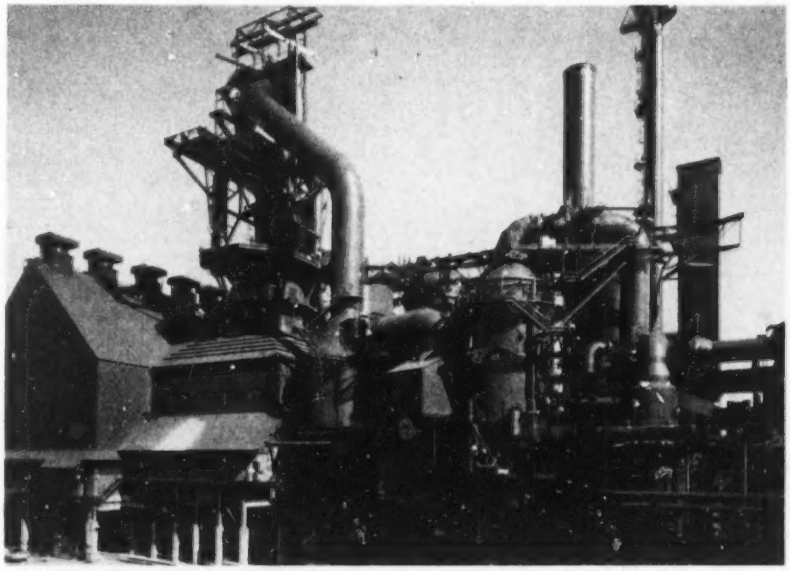
"That excess fuel shows up in silicon in the hot metal and richer gas. That doesn't present us with a problem because we have demands for the energy."

Mr. Milbourne feels the bell-less top has been useful at low operating levels. "We've been able to fine tune the burden distribution to avoid major operating problems. Our availability on this furnace—our tuyere life and conservation of the original lining under very adverse conditions—has really been remarkable. The people here have done a helluva good job. We do attribute at least some of this success to the ability to put burden materials exactly where we want them."

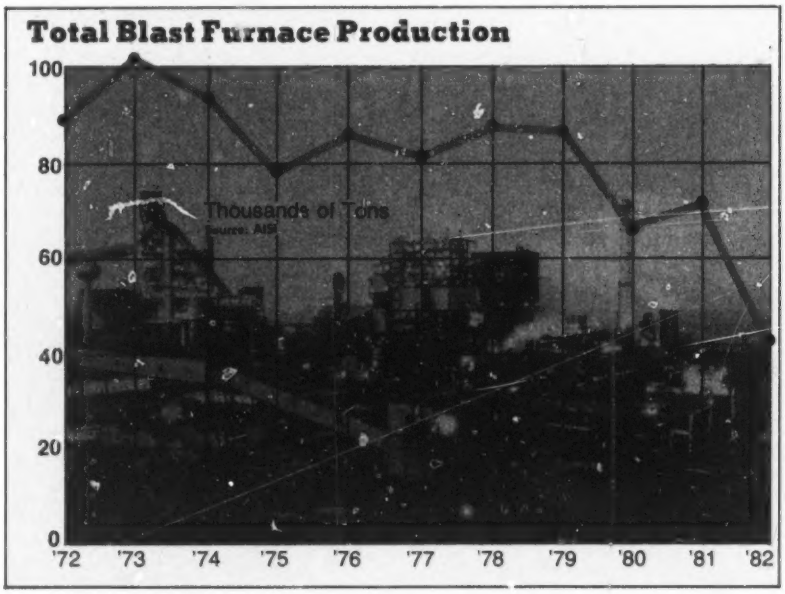
Mr. Milbourne sums up Lake Erie's experience this way: "People have learned to make iron on demand."

There is one potential roadblock ahead for North American blast furnaces. "Most of the American furnaces use primarily pellet burdens," says Mr. Dzermejko of Koppers. "The pellets soften at flame temperatures of about 3,800°F."

Without fuel injection, that translates into a hot blast ceiling of 2,100 or 2,200°F. Anything hotter will cause the acid pellets to soften. "They start getting mushy," says Mr. Dzermjko. "What you get is a semi-congealed mass that hangs up in the furnace and decreases the permeability."



Dofasco, Inc. has followed a systematic, step-by-step plan for upgrading the blast furnaces at its Hamilton, Ontario, plant.



This could be a serious limitation in the future. The Japanese, who operate with flame temperatures as high as 4,400°F., get as much as 8 tons a day per 100 cu ft of working volume.

These results are possible because the Japanese and the Europeans have always relied more on sintering than pelletizing. In recent times, pre-fluxed sinter has been widely used.

Compared to pre-fluxed sinter, the acid pellets have two disadvantages. First, they leave the job of calcining limestone or dolomite to the blast furnace. This adds to furnace energy consumption.

As has been indicated, the second difficulty is that acid pellets can't take high temperatures. This fact has been recognized in Japanese blast furnace practice.

"They cannot stand more than 20 pct acid pellets," says A. Berzins, vice president, engineering, Davy McKee Corp. "They can use 60 pct fluxed pellets."

U.S. producers have run tests on pre-fluxed pellets from Brazil and Sweden. Mr. Berzins reports that lime fluxed pellets soften at 1,155°C. That is compared with softening temperatures of 1,150°C for acid pellets and 1,230°C for superfluxed sinter. A softening temper-

Trends in Metalproducing

In its continuing coverage of metal producing *Iron Age* has in recent months published the following articles:

Steel Turns Loose Billions for Expansion
Sept. 7, '81, p. MP-7

Cooling Heats Up Electric Furnace Production
Oct. 5, '81, p. MP-7

Jones & Laughlin's Pollution Control Philosophy
Nov. 2, '81, p. MP-9

World Steelmakers Chase A Higher Quality Steel
Dec. 7, '81, p. MP-7

Seamless Mills: Steel's Explosion in the Oil Country
Jan. 4, '82, p. MP-8

Wave of Rail Mill Construction Gets Untracked in Steel
Feb. 1, '82, p. MP-4

Steelmaking Controls Give Quality, Throughput, and Energy Efficiency March 1, '82, p. MP-7

New Generation of Electric Furnaces Set New Outer Limit
April 5, '82, p. MP-39

Auto Market Demand Has Sheet Production Stalled in First Gear
May 3, '82, p. MP-3

New Role for Ladle Metallurgy—High Tonnage Output
June 7, '82, p. MP-5

Creative Financing Keeps Money Flowing in Steel
July 5, '82, p. MP-9

Slump Threatens to Pinch the Minimill Growth
Aug. 2, '82, p. MP-5

New Challenge Takes Shape in Rolling Mills
Sept. 6, '82, p. MP-8

Electrical Steels Drive Toward High Efficiency Rating
Oct. 4, '82, p. MP-7

Steel Writes the Final Chapter on Pollution Control
Nov. 1, '82, p. MP-5

World Steel Producers Put Tight Grip on World Steel Output
Dec. 6, '82, p. MP-3

Electric Furnace's One-Two Punch—Low Costs and High Quality
Jan. 3, '83, p. MP-7

Why More Companies Are Committing to Continuous Casting
Feb. 7, '83, p. MP-4

ature of 1,210°C. is reported for dolomite fluxed pellets.

Unfortunately, the dolomite and limestone deposits are nowhere near North American pellet plants. "The problem could be one of economics," says Mr. Ostrowski of National Steel. "You're going to ship the flux to the place where the pellet is produced and then ship the pellet back."

Somewhat similar comments come from Mr. Holditch of Dofasco. "We have run experiments with prefluxed pellets," he says. "They have some disadvantage for our mining operation. What you really want is high temperature reduceability. If you can improve the high temperature properties of pellets, then there are other ways to get calcined flux in your burden." Mr. Holditch mentioned a process in which limestone is calcined in a kiln with 10 pct mill scale. This gives burnt lime with a protective coating.

One answer might be to sinter the ore concentrates. That isn't practical with the very fine concentrates, but there are deposits which can be concentrated in fairly coarse form. If this proves the general answer, more modern sintering capacity would be needed.

The subject is further complicated and confused by commercial considerations. "So many of these arguments are not purely technical," says J. D. Hinrichsen, technical director, mining, minerals and metals, Dravo Engineers, Inc. When people have wanted to secure a price on pellets, he indicates, they have invented tests to show quality problems.

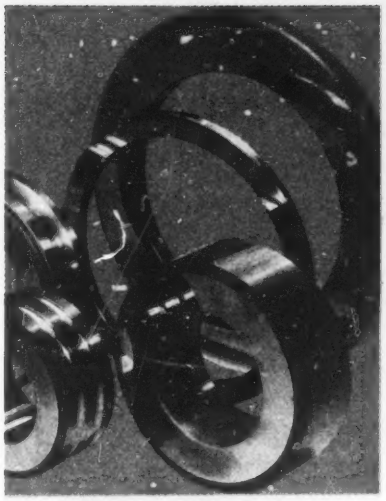
A deterrent to pre-fluxing, says one authority, is the fact that pellets are priced on the basis of iron content. Adding flux would reduce the iron volume in the pellet.

An enormous effort is going into fine tuning blast furnaces today. This takes in off-line simulation, on-line temperature probes and computer control.

In Finland, process controls are credited with reducing the fuel rate to 441 kg per ton at the Koverhar Works of Outokumpu Oy. If Finland seems a long way from Gary, Ind., it really isn't. U. S. Steel is buying the Koverhar process control system for Gary's No. 13 blast furnace.

The Koverhar display unit lets the turn foreman view the furnace "like a video game," says T. M. Barnes, manager of ironmaking technology for Outokumpu Engineering, Inc. The control system can save from 50 to 100 lbs of coke, says Mr. Barnes. Cost is about $1 million.

To get the most out of its bell-less top, Republic has gone to an extensive



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network of probes on its Warren furnace. A supervisory computer provides a graphic display of the temperature profile of the furnace. This information is fed to the controller which operates the top. All elements contributing to flame temperature are continuously monitored.

Mr. Milbourne of Stelco feels hardware is just half the answer in getting good burden distribution. "We have a fair degree of instrumentation on this furnace," he says. "We have extensive in-wall thermocouples and we have an infra-red scanning camera." A Wurth top by itself, has limited value, he indicates. "But a Wurth top in conjunction with other intelligence is very useful, no matter what level of operation."

What people are trying to do is home in on the best combination of design and operating factors. "As you increase your smelting rate," says Mr. Holditch of Dofasco, "you place more demands on your cooling system. And really, operating the furnace is a compromise between distributing the burden to protect the walls and improving your cooling system so it can afford the luxury of charging your burden for maximum efficiency."

In their optimizing, operators are being assisted by the work steel companies are sponsoring at Purdue Laboratory for Applied Industrial Control. The Purdue people have devised a dynamic model of the blast furnace.

"This model has been verified at Bethlehem and Algoma," says T. J. Williams, professor of engineering at Purdue and director of the laboratory. "We can do anything you do in a real blast furnace."

Purdue, incidentally, has come up with a hierarchial computer control system for the overall steel plant. The Japanese have placed great emphasis on this type of control.

Dofasco and others have been looking at plasma torches for iron making. At the AIME electric furnace conference, a report on the use of a plasma furnace for smelting ores and mill wastes was given by Tectronics Research and Development Co., Ltd., Faringdon, Oxon, England.

The plasma torch of Westinghouse Electric Corp. has been used in European research to heat natural gas and air injections to a blast furnace. These developments suggest there is no end in sight to the ways of upgrading existing furnaces. □

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EFFECTIVE FEBRUARY 21, 1983

MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Steel Production, Composite Prices

(Effective February 21, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,401	1,373	9,252	12,415
Capability Utilization Rate	48.3	47.4	44.7	59.0

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	25.954	25.195
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 69.83	$ 67.50	$ 66.83	$ 82.50
No. 2 bundles	$ 47.83	$ 47.83	$ 47.83	$ 56.17
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 74.50	$ 69.50	$ 69.50	$ 92.50
No. 1 steel, Philadelphia	63.50	61.50	59.50	75.50
No. 1 steel, Chicago	71.50	71.50	71.50	79.50
No. 1 bundles, Detroit	61.50	61.50	60.50	83.50
Low Phos., Youngstown	69.50	69.50	69.50	95.50
No. 1 mach'y cast., Pgh	66.50	66.50	66.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	113.50
No. 1 mach'y cast. Chi	109.50	109.50	109.50	124.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Nonferrous Prices

(Effective February 21, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	82.00-83.00	80.00-83.00	2/16/83
Lead	21.00-23.00	20.50-23.00	2/17/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	1/11/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.25-$1.40
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $505.50
Indium, dollars per troy oz. ..... $2.60-$2.85
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$335-$360
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $14.49
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Feb. 14—Holiday
Feb. 15—Holiday
Feb. 16—590.91
Feb. 17—588.84
Feb. 18—588.84

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	75½	66¼
Yellow brass	64¼	63
Red brass	69½	65
Comm. bronze	71	65
Mang. bronze	62¾	61
Free cutting rod ends	55	54

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	70
No. 2 copper wire	62
Light copper	53

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	66
No. 2 copper wire	58
Light copper	49
No. 1 composition	53
No. 1 comp. turnings	49
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	27
Radiators	43

Aluminum

New mixed clips	31	—32
Old sheet	29	—30
Old cast	29	—30
Clean dry borings	30	—31

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	25	—26
Mixed L.C. clips	22	—23
Old sheets and cast	17	—18
Borings and turnings	11	—12
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	53	—54
No. 2 copper wire	46	—47
Light copper	41	—42
Radiators	35	—36
No. 1 composition	42	—43
No. 1 composition turn'gs	40	—41
Cocks and faucets	31	—32
Clean heavy yellow brass	29	—30
Brass Pipe	29	—30
New soft brass clippings	40	—41

Lead

Heavy soft lead	10	—11
Whole batteries	4	— 5
Type metal	15	—16
Electrotype	17	—18

Nickel

Nickel solids	95	—100
Nickel rod ends	95	—100
Nickel sheets, clips	95	—100
Nickel turnings	45	— 50

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

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EFFECTIVE FEBRUARY 21, 1983

MATERIALS NEWSFRONT

(Effective February 21, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 74.00 to	$ 75.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	87.00 to	88.00
No. 1 factory bundles (auto)	87.00 to	88.00
No. 2 bundles	49.00 to	50.00
No. 1 busheling	87.00 to	88.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	87.00 to	88.00
Heavy turnings	64.00 to	65.00
No. 1 RR hvy. melting	81.00 to	82.00
Rails 2 ft. and under	94.00 to	95.00
Scrap rails, random lgth.	87.50 to	88.50
RR specialties	83.00 to	84.00
No. 1 machinery cast	66.00 to	67.00
Cupola cast	59.00 to	60.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	465.00 to	475.00
18-8 turnings	365.00 to	375.00

Chicago

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	62.00 to	63.00
No. 1 dealer bundles	83.00 to	84.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	49.00 to	50.00
No. 1 busheling	80.00 to	81.00
Shredder scrap	80.00 to	81.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	36.00 to	37.00
Low phos. forge crop	89.00 to	90.00
Low phos. punchings plate ¼ in. and heavier	95.00 to	96.00
Low phos. 2 ft. and under	90.00 to	91.00
No. 1 RR hvy. melting	77.00 to	78.00
Scrap rails, random lgth.	69.00 to	70.00
Reroller rails	95.00 to	96.00
Rails, 2 ft. and under	91.00 to	92.00
RR couplers and knuckles	79.00 to	80.00
RR car axles	104.00 to	105.00
No. 1 machinery cast	109.00 to	110.00
Cupola cast	94.00 to	95.00
Stove plate	88.00 to	89.00
Steel car wheels	79.00 to	80.00
Stainless		
18-8 bundles and solids	440.00 to	450.00
18-8 turnings	340.00 to	350.00
430 bundles and solids	105.00 to	110.00
430 turnings	80.00 to	85.00

Philadelphia

No. 1 hvy. melting	$ 62.00 to	$ 65.00
No. 2 hvy. melting	52.00 to	55.00
No. 1 dealer bundles	77.00 to	80.00
No. 2 dealer bundles	43.00 to	46.00
No. 1 busheling	77.00 to	80.00
Shredder scrap	74.00 to	77.00
Machine shop turn.	22.00 to	25.00
Mixed bor. and turn.	22.00 to	25.00
Shoveling turnings	37.00 to	40.00
Low phos. 5 ft. and under	75.00 to	78.00
Low phos. 2 ft. punchings	89.00 to	92.00
Electric furnace bundles	86.00 to	89.00
RR specialties	76.00 to	79.00
Rails, 2 ft. and under	91.00 to	94.00
Cupola cast	57.00 to	60.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 48.00 to	$ 49.00
No. 2 hvy. melting	46.00 to	47.00
No. 1 dealer bundles	61.00 to	62.00
No. 2 bundles	27.00 to	28.00
No. 1 busheling	60.00 to	61.00
Drop forge flashings	37.00 to	38.00
Machine shop turn.	22.00 to	23.00
Mixed borings and turn.	11.00 to	12.00
Shoveling turnings	22.00 to	23.00
Cast iron borings	10.00 to	11.00
Heavy breakable cast	29.00 to	30.00
Mixed cupola cast	45.00 to	46.00
Automobile cast	65.00 to	66.00
Stainless		
18-8 bundles and solids	355.00 to	365.00
18-8 turnings	235.00 to	245.00
430 bundles and solids	85.00 to	95.00

Youngstown

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	76.00 to	77.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	69.00 to	70.00
Electric furnace bundles	75.00 to	76.00
Galvanized bundles	65.00 to	66.00

Cleveland

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	74.00 to	75.00
No. 1 factory bundles	81.00 to	82.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	74.00 to	75.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	95.00 to	96.00
Low phos. punchings plate	95.00 to	96.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	99.00 to	100.00
Rails, 18 in. and under	100.00 to	101.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	89.00 to	90.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	275.00 to	285.00
18-8 turnings	225.00 to	235.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 29.00 to	$ 30.00
No. 2 hvy. melting	19.00 to	20.00
No. 1 busheling	34.00 to	35.00
No. 1 dealer bundles	32.00 to	33.00
No. 2 bundles	16.00 to	17.00
Machine shop turn.	5.00 to	6.00
Mixed bor. and turn.	12.00 to	13.00
Shoveling turnings	14.00 to	15.00
Cast iron borings	11.00 to	12.00
Low phos. plate	52.00 to	53.00
Structural and plate, 2 ft. and under	50.00 to	51.00
Rails, 2 ft. and under	46.00 to	47.00
Scrap rails, random lgth.	26.00 to	27.00
No. 1 machinery cast	67.00 to	68.00
No. 1 cupola cast	44.00 to	45.00

St. Louis

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	50.00 to	51.00
Foundry steel, 2 ft.	50.00 to	51.00
No. 1 dealer bundles	58.00 to	59.00
No. 2 bundles	47.00 to	48.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	58.00 to	59.00
Rails, random length	49.00 to	50.00
Rails, 18 in. and under	64.00 to	65.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 56.00 to	$ 57.00
No. 2 heavy melting	52.00 to	53.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	40.00 to	41.00
No. 1 busheling	54.00 to	55.00
Shredder scrap	71.00 to	72.00
Machine shop. turn.	18.00 to	19.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	53.00 to	54.00
Elec. furnace, 3 ft. & under	50.00 to	51.00
Structural and plate, 2 ft.	70.00 to	71.00
Structural and plate, 4 ft.	69.00 to	70.00
No. 1 RR hvy. melting	55.00 to	56.00
Scrap rails, random lgth.	57.00 to	58.00
Rails, 18 in. and under	74.00 to	75.00
Angles and splice bars	67.00 to	68.00
No. 1 cupola cast	74.00 to	75.00
Unstripped motor blocks	52.00 to	53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 46.00 to	$ 47.00
No. 2 hvy. melting	45.00 to	46.00
No. 1 dealer bundles	47.00 to	48.00
No. 2 bundles	26.00 to	27.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	7.00 to	8.00
Cast iron borings	8.00 to	9.00
Low phos. 18 in. and under	73.00 to	74.00
Rails, random length	55.00 to	56.00
Rails, 2 ft. and under	77.00 to	78.00
No. 1 cupola cast	60.00 to	61.00
Heavy breakable cast	24.00 to	25.00
Drop broken cast	64.00 to	65.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 29.00 to	$ 30.00
No. 2 hvy. melting	25.00 to	27.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	410.00 to	425.00
18-8 turnings	300.00 to	325.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 32.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	25.00
No. 1 dealer bundles	37.00 to	39.00
No. 2 bundles	20.00 to	22.00
No. 1 busheling	37.00 to	39.00
Shredder scrap	38.00 to	40.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	1.00 to	2.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	23.00 to	25.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	27.00 to	29.00
No. 1 dealer bundles	25.00 to	27.00
No. 2 dealer bundles	8.00 to	10.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 55.00 to	$ 57.00
No. 2 hvy. melting	44.00 to	46.00
No. 2 bundles	33.00 to	35.00
No. 1 cupola cast	90.00 to	92.00
Mixed yard cast	78.00 to	80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 38.00
No. 2 heavy melting cut 2 ft. and under	35.00
No. 1 dealer bundles	45.00
No. 2 bundles	5.00
Mixed steel scrap	22.00
Bush. new fact. prep'd.	43.00
Bush. new fact. unprp'd.	35.00
Machine shop turn.	20.00
Short steel turn.	23.00
Mixed bor. and turn.	12.00
Cast scrap	35.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	40.00 to	41.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	12.00 to	13.00
Crushed turnings	24.00 to	26.00
Shredder scrap	52.00 to	53.00
Cut structural plate 2 ft. and under	74.00 to	76.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	66.00

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STEEL PRICES

Codes identify Producers listed in the Key on page 41. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A.=Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10, U1	$453.00
R3	$453.00
Midwest	
R3, U1, W5	$453.00
S1	$453.00
C10	$453.00
K2	$453.00
W5	$453.00
West	
B3(2)	$463.00
C6	$453.00
South	
A7	$453.00
Alloy, East	
R3, C10	$492.00
B3	$492.00
Midwest	
W8, W5, C10	$492.00
S1, U1	$492.00
R3	$492.00
West	
B3	$502.00
C6	$469.00
South	
A7	$492.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7	24.15
C20	22.90
W8	22.90
I3, T10, U1, N4	23.90
West	
C6	25.10
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	23.90
W8	24.15
U1	23.90
I3	23.90
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	23.90
I3	23.90
West	
U1	24.40
C6	24.15
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut ll Edge—all widths, East	
B3, U1	22.05
J3	22.05
Midwest	
A7, D1	22.05
I4	20.20
S1, J3, D1	22.05
W3	22.05
N4	22.55
W5	22.05
U1	22.05
B3, G2, I3, M2, R3, G3	22.05
West	
K1	20.80
B3	24.70
South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
R7, S10, B4	29.60
P15	24.80
S7	Cmp*
U1	35.30
D1(1)	Cmp*
B4	31.55
Midwest	
G4	24.80
I4	30.15
W14	22.95
S1, J4	34.05
T4	Cmp*

*Composite pricing

West	
U1	33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, (plus extras)*	
Midwest	
M2, G3, R3, W3, I4, J3, G2, I3	22.05
A7	22.05
S1	22.05
West	
K1	22.05
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	24.60
G4	25.80
I4	22.70
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	42.60
P15	32.10
Midwest	
I4	39.40
S1	42.30

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	22.05
J3	22.05
U1	22.05
Midwest	
A7, U1, B3, G2, G3, I3, M2, R3, W3	22.05
S1, W5, D1	22.05
J3	22.05
I4	19.90†
West	
U1	21.30
K1	22.05
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2), U1	26.15
J3	26.15
Midwest	
B3, I3, G3, R3, M2, U1(2)	26.15
G2, W3, M11	26.15
I4	22.00
J3, A7	26.15
S1, W5, D1	26.15
West	
U1	26.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2), U1	28.00
Midwest	
J3, D1	28.00
I3, W5, S1	28.00
U1, A7, R3, Y1	28.00
G2, W3, M11	28.00
West	
K1	27.15
U1	28.50
South	
U1	28.00
R3	28.00
Enameling, Midwest	
A7, I3, U1, J3	27.65
S1	26.50
Long-Terne, Midwest	
W5	28.30
A7, U1	29.35
R3	29.35

†Actual weight basis

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
B3	23.25
South	
G7	22.35

Tinplate

Electrolytic Tinplate

Single Reduced (70 lb)	
East	**per base box**
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$26.79
U1	26.79
South	
U1	$26.29
Double Reduced (55 lb)**	
Midwest	
M11 (50 lb)	$21.49
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$21.99
U1	21.99
South	
U1	$21.49
Black Plate	
Single Reduced (75 lb)*	
East	
B3	$24.01
Midwest	
J3	$24.01
M11	24.01
I3, U1, W5	24.01
W3	24.01
West	
K1	$24.01
U1	23.36
Double Reduced (55 lb)	
East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

*70 lb—base weight extra 45¢
**50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3	25.80
R5	25.80
B3(3), J3	25.80
U1, C10	25.80
Midwest	
A7	23.95
U1, I3, I4, C20, N4	25.80
R3, T10	25.80
K2	25.80
I3	19.50*
West	
B3	25.80
C6	24.45
B3	24.70
South	
A8	20.65
A7	25.80
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
C21	21.15
J3(4), L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	31.00
M1	23.025
B4, C10	31.00
Midwest	
B5, W10, Y1, W8, R3	33.25
J3	31.00
B1	19.80
L2	30.75
N9	31.00
P3	19.85+CMS
W14	22.20
J3(3)	31.00
B5	31.25
J3	31.00
West	
B5	31.20
B5	34.90
R3	37.15
South	
B5	32.85
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10, U1	27.95
R3	27.95
J3	27.95
Midwest	
A7, U1, R3	27.95
I3, C10	27.95
I4	24.85
I3	21.00*
West	
B3	27.95
B5	18.50
C6	26.60
B3	27.10
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	37.90
M1	28.025
R4	25.65
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	34.25
Midwest	
B5, R3, C10	37.35
C2	28.275
J3, M9, W10	34.85
P3	22.75
B1	22.70
N9	34.85
L2	34.65
B5	35.10
J3	36.00
J3	34.85
West	
R3	40.75
B5	35.20
B5	38.25
South	
J3	35.85
C16	28.00
B5	36.75

Plates

Carbon Steel, East	
B3(2), U1	25.75
L4	25.75
P2	25.75
J3	26.75
Midwest	
B3, S1	25.75
I3	24.25
J3, A7	22.80
U1, I4	25.75
R3	26.75
West	
A7, B3, C6, O2	24.25
K1	23.50
U1	25.75
South	
R3	25.75
A7	25.75
U1	25.75
Alloy, East	
B3, J3	33.55
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	33.55
G2, G3	33.55
I4, U1	33.55
West	
B3	33.55
O2	30.55
K1	31.30
South	
A7	27.55

Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
U1	27.70
A7, R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
A7	25.95
C6	24.95

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities* / City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	22.25	27.91	31.51	31.86	24.27	26.45	17.89	32.91	42.10	52.60	69.58	73.19
Baltimore	32.25	24.49	32.76	34.74	28.33	31.13	22.17	36.44	55.85	59.91	67.79	76.32
Birmingham	22.27	28.05	32.24	31.99	24.06	26.26	17.99	33.40	49.31	68.90	68.16	74.43
Boston	23.43	28.25	31.93	44.27	37.43	37.68	21.80	47.75	57.60	60.66	68.49	75.74
Buffalo	27.75	34.41	36.35	43.01	35.20	32.46	18.26	45.85	54.11	55.64	62.09	70.72
Chicago	22.26	28.66	31.01	29.34	26.76	27.28	15.83	35.60	35.94	42.45	49.53	54.47
Cincinnati	23.88	29.74	32.95	33.98	26.44	29.86	16.74	36.10	35.89	41.74	47.18	52.56
Cleveland	28.85	32.41	34.98	32.65	28.44	32.10	17.97	42.92	39.27	49.22	55.16	61.24
Denver	32.69	38.65	38.66	42.32	36.91	38.18	22.79	49.35	56.13	65.40	72.50	81.22
Detroit	24.88	31.65	32.95	33.74	26.31	26.79	16.83	37.64	36.87	40.55	46.33	52.90
Houston	23.83	28.28	32.53	41.35	34.12	37.90	17.16	38.14	36.36	42.15	50.79	56.90
Kansas City	23.37	27.16	31.59	30.36	30.20	34.55	17.37	43.29	41.88	50.92	56.17	63.93
Los Angeles	30.02	38.03	39.14	45.66	37.13	38.95	33.49	50.38	62.24	72.33	77.74	89.22
Memphis	31.68	36.62	38.40	38.57	31.40	35.20	32.21	42.33	52.82	56.96	67.85	77.44
Milwaukee	22.92	29.30	31.79	31.10	28.50	29.20	15.71	36.06	36.88	47.20	52.71	59.02
New York	22.00	26.53	30.70	42.40	31.67	32.93	20.83	48.87	50.98	59.83	66.45	75.35
Philadelphia	29.67	35.27	37.96	45.73	32.87	36.09	22.93	48.35	51.67	58.71	67.13	74.37
Pittsburgh	24.35	28.58	32.34	41.36	35.30	27.43	25.80	43.19	48.95	59.88	66.19	72.84
Portland	32.04	37.16	41.51	33.10	34.82	38.20	53.64	56.85	61.00	64.10	66.10	....
San Francisco	29.27	35.77	39.71	45.05	38.70	39.18	31.92	51.14	62.56	71.65	77.93	86.10
Seattle	29.85	35.14	37.68	46.76	32.89	35.32	29.86	51.38	64.02	70.14	73.83	87.67
Spokane	21.08	30.56	33.56	36.69	35.18	25.16	20.32	41.00	42.02	46.30	....	58.32
St. Louis	25.80	30.08	33.47	38.51	27.81	32.45	19.08	42.83	43.13	51.08	58.11	63.64
St. Paul	23.43	27.76	32.10	35.20	29.31	32.38	16.87	43.07	39.20	48.63	51.53	60.75

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ⅜-2⅛"; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1⅜" round; Cold drawn—1" round; Hot-rolled 4140—1⅜" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

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Chilton's

MARCH 16, 1983

IRON AGE

THE MAGAZINE FOR METALWORKING MANAGEMENT

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THE TRUTH ABOUT CAPITAL SPENDING

HI-TECH REPORT: HOW THE COMPUTER IS REVOLUTIONIZING NDT

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VOL. 226, NO. 8

IRON AGE

MARCH 16, 1983

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Steel industry appears poised for a dramatic turnaround: product demand is rising and new labor pact cuts production cost.

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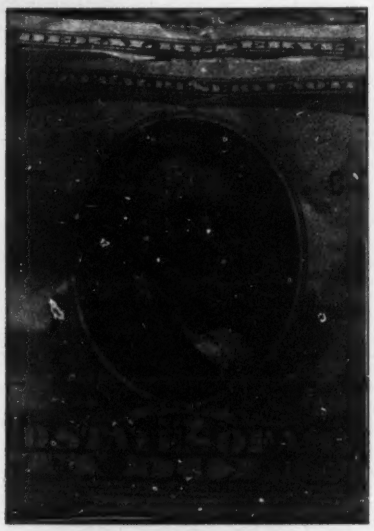

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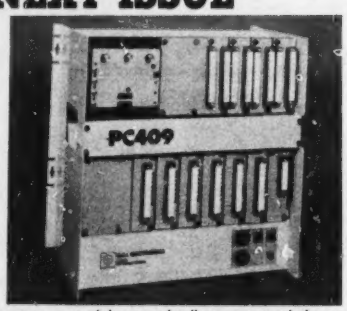

Programmable controllers move into motion control.

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A DARK CLOUD OF PLANT HANGS OVER SUNNY

The automobile and steel companies are shutting facilities due to poor market conditions, import competition and inefficient operations.

"Well I'm not braggin' babe, so don't put me down.
But I've got the fastest set of wheels in town.
When something comes up to me, and he don't even try
'Cause if I had a set of wings, man, I know she could fly.
She's my little deuce coupe. You don't know what I got."

The Beach Boys, 1963

BY AL SENIA

From the beginning, cars and California seemed to stand together.

Beginning in 1912, when Ford Motor Co. unveiled its first sales service branch in downtown Los Angeles through the 1960s and 1970s when more than one million cars per year were manufactured at California plants, the marriage between the two seemed eternal.

The list of cars built in the state reads like a roster of vintage Americana: the ill-fated Edsel, populist Mercury Comet, sizzling Mustang, sleek Camaro, LTDs, Escorts, Tempests, Buick Specials, Firebirds. In all, Ford, Chrysler and General Motors produced more than 15 million trucks and cars before the recession started taking its toll, the imports invaded and closures began. The industry once employed 20,000 in the state.

Now, unemployment lines are replacing assembly lines. Only one shift at one General Motors plant in suburban Van Nuys stands between the California auto industry and oblivion. The future outlook is bleak; few expect any large-scale recovery for the California auto industry even if the market improves. California, in response, is participating in a comprehensive worker retraining and placement program for thousands of auto and other industrial workers who have lost jobs.

Chrysler pulled out of the manufacturing end of the market in 1971. Ford closed a manufacturing facility in Pico Rivera near Los Angeles in 1980 and is shutting down its other near San Jose in May. General Motors shuttered facilities in South Gate and Fremont last year. Only Van Nuys remains operational, and GM eliminated the second shift of 2,500 workers there last year.

Some officials have speculated that recent sales increases might result in the workers being recalled. But the United Autoworkers has become so alarmed by the automaker's plans to consolidate manufacturing operations in the Midwest, that it fears the entire Van Nuys plant may be shut. Union leaders, legislators and community groups launched an effort in March to convince GM that it has a "moral responsibility" to keep Van Nuys operating.

Meanwhile, GM and Toyota Motor Corp. announced plans in February to establish a joint venture to produce cars at the Fremont plant. But it is not certain that the idled auto workers will be hired by the new company.

The agreement is tinged with irony. Imports are being blamed for the decline of the California auto industry. Nearly 51 pct of new car sales in California in 1981 were imports, compared to less than 30 pct nationally. Since the parts from which the American cars were assembled were shipped from the

CLOSINGS CALIFORNIA

Middle West, when West Coast buyers turned increasingly to imports, major manufacturers faced high backshipping costs. There were some estimates that GM had to backship as much as 75 pct of its California cars to the East Coast market. Ford faced a similar problem.

"We're not conceding anything to the Japanese," said spokesman Dick Dewey, in explaining why Ford is preparing to shut down its last remaining California production plant near San Jose in May. "Our role is to introduce products that compete head-to-head. We plan to continue the battle, but you can't do it from a manufacturing base on the West Coast at this time. To manufacture on the West Coast, we have to ship parts out from the east. Then we have to either sell in the area or backship to markets that take them."

The battle of the auto manufacturers is one that has spread well beyond their confines. California, which often boasted it was a "Gateway to the Pacific Rim" through which American products could be shipped inexpensively to Asia, has discovered over the past decade that the gateway is a decidedly two-way street. Tens of thousands of workers have permanently lost their jobs, and the belief among state officials is that those hanging on to their posts in basic industries that produce autos, steel and tires may be the last generation here to do so.

The California Employment Development Department estimates that since 1980, 1,127 plants have closed in the state and 123,304 workers have lost their jobs. More than two dozen additional firms employing 7,600 workers already have announced plans to follow suit in 1983. Among the industries most severely affected are transportation equipment (which include auto and truck production) where there have been 33 plant closures and 19,705 jobs lost; primary metal industries (14 closures, 2,844 laid off); fabricated metal (37 closures, 4,546 unemployed), and machinery (30 closures, 5,045 jobs eliminated).

The pattern of West Coast closures began to develop in the 1970s. It was the rubber industry that first fell to imports and its own weaknesses that sprang from antiquated facilities. With imported tires capturing an increasing share of the market—and with the advent of radials that the California facilities were not geared to produce—closures began and quickly spread.

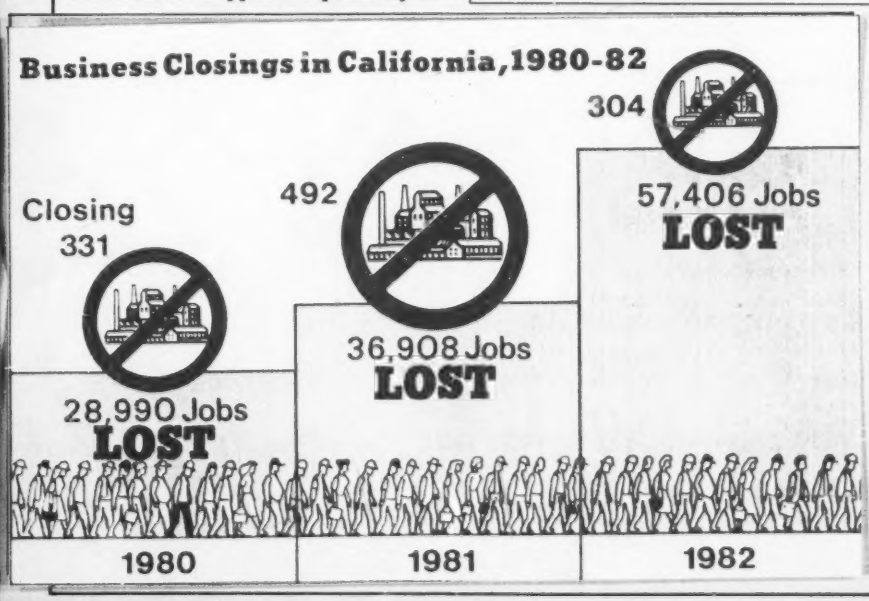
West Coast steel manufacturers also are reeling from the recession. Once

Business Closures by Major Industry

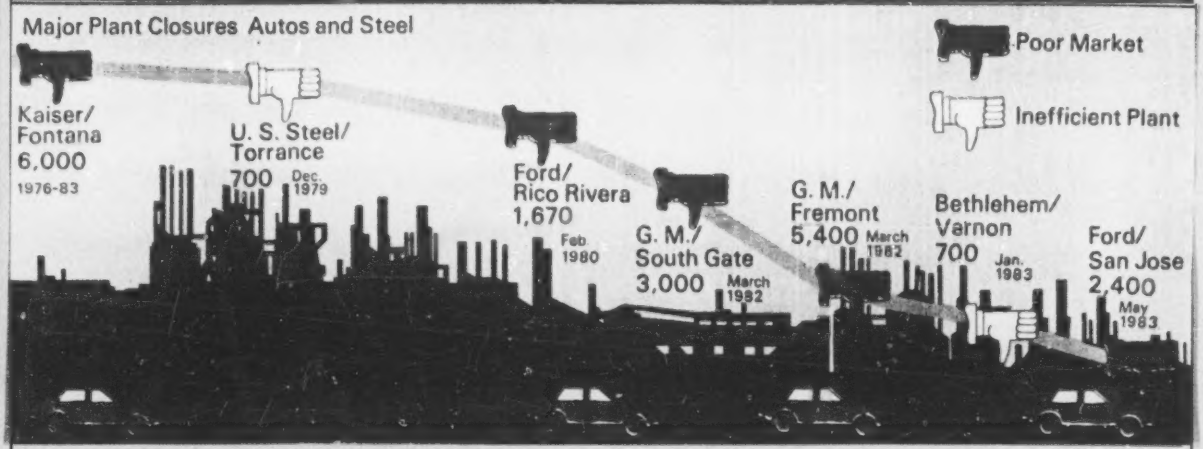
California 1980-1982

SIC	SIC NAME	JOBS LOST*	CLOSURES**
30	Rubber, Plastics Products	5,725	17
33	Primary Metals	2,844	14
34	Fab. Metal except machinery & transp.	4,546	37
35	Machinery, Except Electrical	5,045	30
36	Electrical and Electronic	8,722	29
37	Transportation Equipment	19,705	33
55	Automotive dealers, Gas Stations	3,964	63
75	Auto Repair, Garages	385	8

*Jobs Lost=Firms' peak monthly employment in 24 months prior to closure. **Data for less than 3 firms are suppressed for confidentiality.



Charting the West Coast Decline



Iron Age Survey

again, imports are being singled out as the major culprit. Kaiser Steel has been especially hard hit. The company sold its coke plant and several blast furnaces in Fontana and is restructuring its steelmaking operations there. In 1981 the company announced that steelmaking, the coke plant, slabbing mill and blast furnaces would be phased out this year. Finishing facilities—strip mill, plate mill, tin mill, and galvanizing mill—are being operated on an as-needed basis.

The labor force is down to about 2,500 from a 1979 peak of 8,500. Bethlehem Steel Corp. shut down its Vernon plant in 1982 and is planning to sell a profitable Seattle plant. The Vernon facility had been operating at about 30 pct of its steelmaking capacity of 450,000 tons. Poor profits were blamed for the divestiture of West Coast steelmaking operations.

U. S. Steel also has been belt-tightening. The company permanently closed its Torrance, Calif. facility in December 1979, laying off 700. And at Geneva Wells near Provo, Utah, the work force has been reduced because that plant has been operating 35 to 40 pct of capacity. About 2,000 employees have been laid off. "We're providing steel as we find the customers," said David Bigler, a West Coast company spokesman.

The impact on related industries and on communities where these closures and layoffs have occurred is varied. The auto industry shutdown had little effect on related industries because the plants were solely assembly centers.

The effects of the steel manufacturing shutdown, however, appear to be more dramatic. While many West Coast mini-mills are continuing to produce specialty products as demand dictates, there is fear Kaiser's impact as a stabilizing force on the steel market will be felt over the long-term.

Group Arcon, a Los Angeles-based study group, prepared a report on Kaiser for the San Bernardino Economic Development Department in 1980. That study found that "the competition in the market place has led out-of-state producers to offer freight allowances to meet the price of the local mill (Kaiser Steel) and forced the price of imports to a competitive level. It is reasonable to assume that in the absence of a local producer, other mills will no longer give these discounts. The impact on the local economy would be very significant."

The study estimated steel prices could rise in the California market by $60 to $100 a ton if Kaiser stopped making steel in California.

Imports have been routinely cited as the reason for many West Coast industrial closures. But Carl Grossenbacher, the assistant chief of the California Job Service Division of the Employment Development Department, says there are other factors at work. Many of the basic industries like steel, automobiles and rubber are feeling shake-out effects from old, inefficient plants and archaic operating procedures. It's no surprise to him that many of the shuttered facilities don't reopen when economic conditions improve.

Whatever the factors, all sides are pleased with California's unique efforts to establish training and re-employment centers in areas hardest hit by industrial closings. The state has been a leader in getting the private sector to lend a hand.

More than 20 centers have been established around the state. About one dozen are operating presently. Mr. Grossenbacher says the state will temporarily establish the job service office when it appears a community will be adversely affected by closings and local employers are willing to lend a hand.

The centers are temporary, he stresses, because the state cannot afford to establish numerous new job service field offices.

The job plan that has attracted the largest attention in California involves an $8 million commitment by General Motors, the state and the United Auto Workers to counsel, retrain and place thousands of auto workers. About $4 million of the money comes from a special training fund negotiated between G.M. and the union last year. The remainder comes from state and Federal sources.

Approximately 8,400 former G.M. employees are eligible, including the 5,400 laid off at Fremont and 3,000 from South Gate. "It's historic," says Mr. Grossenbacher. "We've never seen so many agencies working together." Officials describe the program, which will run through this year, as a unique attempt to match laid off workers with specific new jobs in fields where there are labor shortages.

The California program could serve as a model for the U.S. auto industry. Ford officials also are considering undertaking a similar effort with the state. The company in December began operating its own program to develop jobs to train and to place workers laid off in Pico Rivera (and now, Milpitas near San Jose).

"Our people have been out actively searching for jobs," says Ford's Dick Dewey. We're all doing all we can. These employees are extremely good and loyal and they've had long service with Ford. We're very concerned that they make the best decisions about their futures that is possible." □

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EFFECTIVE FEBRUARY 28, 1983

MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective February 28, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,457	1,401	10,770	14,216
Capability Utilization Rate	50.3	48.3	45.6	59.3

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	25.954	25.195
Pig Iron* * (Net ton= 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 75.17	$ 69.83	$ 67.50	$ 82.50
No. 2 bundles	$ 51.83	$ 47.83	$ 47.83	$ 56.17
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh .	$ 79.50	$ 74.50	$ 69.50	$ 92.50
No. 1 steel, Philadelphia	63.50	63.50	61.50	75.50
No. 1 steel, Chicago.....	82.50	71.50	71.50	79.50
No. 1 bundles, Detroit..	75.50	61.50	61.50	83.50
Low Phos., Youngstown	69.50	69.50	69.50	95.50
No. 1 mach'y cast., Pgh	79.50	66.50	66.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	113.50
No. 1 mach'y cast., Chi..	112.50	109.50	109.50	124.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective February 28, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	84.00	83.00-84.00	2/25/83
Lead	21.00-23.00	20.50-23.00	2/17/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	1/11/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.25-$1.40
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $408.50
Indium, dollars per troy oz. ..... $2.60-$2.85
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$325-$350
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $10.95
Vanadium $4.94
Zirconium sponge ..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Feb. 21—590.58 Feb. 24—589.37
Feb. 22—590.31 Feb. 25—590.57
Feb. 23—588.03

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	75½	66¼
Yellow brass	64¼	63
Red brass	69½	65
Comm. bronze	71	65
Mang. bronze	62¾	61
Free cutting rod ends	55	54

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	71
No. 2 copper wire	63
Light copper	54

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	67
No. 2 copper wire	59
Light copper	50
No. 1 composition	53
No. 1 comp. turnings	49
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	27
Radiators	43

Aluminum

New mixed clips	31	—32
Old sheet	29	—30
Old cast	29	—30
Clean dry borings	30	—31

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	25	—26
Mixed L.C. clips	22	—23
Old sheets and cast	17	—18
Borings and turnings	11	—12
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	53	—54
No. 2 copper wire	46	—47
Light copper	42	—43
Radiators	35	—36
No. 1 composition	42	—43
No. 1 composition turn'gs	40	—41
Cocks and faucets	31	—32
Clean heavy yellow brass	29	—30
Brass Pipe	29	—30
New soft brass clippings	41	—42

Lead

Heavy soft lead	10	—11
Whole batteries	4	— 5
Type metal	15	—16
Electrotype	17	—18

Nickel

Nickel solids	95	—100
Nickel rod ends	95	—100
Nickel sheets, clips	95	—100
Nickel turnings	45	— 50

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

EFFECTIVE FEBRUARY 28, 1983

MATERIALS NEWSFRONT

(Effective February 28, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 79.00 to	$ 80.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	91.00 to	92.00
No. 1 factory bundles (auto)	91.00 to	92.00
No. 2 bundles	54.00 to	55.00
No. 1 busheling	91.00 to	92.00
Machine shop turn.	13.00 to	14.00
Shoveling turnings	25.00 to	30.00
Cast iron borings	28.00 to	29.00
Low phos. punchings plate	91.00 to	92.00
Heavy turnings	69.00 to	70.00
No. 1 RR hvy. melting	84.00 to	85.00
Rails 2 ft. and under	94.00 to	95.00
Scrap rails, random lgth.	87.50 to	88.50
RR specialties	83.00 to	84.00
No. 1 machinery cast	79.00 to	80.00
Cupola cast	74.00 to	75.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	465.00 to	475.00
18-8 turnings	365.00 to	375.00

Chicago

No. 1 hvy. melting	$ 82.00 to	$ 83.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	90.00 to	91.00
No. 1 factory bundles (auto)	93.00 to	94.00
No. 2 dealer bundles	54.00 to	55.00
No. 1 busheling	84.00 to	85.00
Shredder scrap	82.00 to	83.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	41.00 to	42.00
Low phos. forge crop	94.00 to	95.00
Low phos. punchings plate ¼ in. and heavier	100.00 to	101.00
Low phos. 2 ft. and under	94.00 to	95.00
No. 1 RR hvy. melting	84.00 to	85.00
Scrap rails, random lgth.	76.00 to	77.00
Reroller rails	101.00 to	102.00
Rails, 2 ft. and under	97.00 to	98.00
RR couplers and knuckles	86.00 to	87.00
RR car axles	109.00 to	110.00
No. 1 machinery cast	112.00 to	113.00
Cupola cast	97.00 to	98.00
Stove plate	94.00 to	95.00
Steel car wheels	89.00 to	90.00
Stainless		
18-8 bundles and solids	440.00 to	450.00
18-8 turnings	340.00 to	350.00
430 bundles and solids	105.00 to	110.00
430 turnings	80.00 to	85.00

Philadelphia

No. 1 hvy. melting	$ 62.00 to	$ 65.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	77.00 to	80.00
No. 2 dealer bundles	45.00 to	48.00
No. 1 busheling	77.00 to	80.00
Shredder scrap	74.00 to	77.00
Machine shop turn.	22.00 to	25.00
Mixed bor. and turn.	22.00 to	25.00
Shoveling turnings	37.00 to	40.00
Low phos. 5 ft. and under	75.00 to	78.00
Low phos. 2 ft. punchings	89.00 to	92.00
Electric furnace bundles	95.00 to	98.00
RR specialties	76.00 to	79.00
Rails, 2 ft. and under	91.00 to	94.00
Cupola cast	60.00 to	63.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	51.00 to	52.00
No. 1 dealer bundles	75.00 to	76.00
No. 2 bundles	32.00 to	33.00
No. 1 busheling	73.00 to	74.00
Drop forge flashings	50.00 to	51.00
Machine shop turn.	28.00 to	29.00
Mixed borings and turn.	14.00 to	15.00
Shoveling turnings	28.00 to	29.00
Cast iron borings	13.00 to	14.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	69.00 to	70.00
Stainless		
18-8 bundles and solids	430.00 to	440.00
18-8 turnings	310.00 to	320.00
430 bundles and solids	120.00 to	130.00

Youngstown

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	79.00 to	80.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	69.00 to	70.00
Electric furnace bundles	75.00 to	76.00
Galvanized bundles	65.00 to	66.00

Cleveland

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	77.00 to	78.00
No. 1 factory bundles	89.00 to	90.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	77.00 to	78.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	95.00 to	96.00
Low phos. punchings plate	95.00 to	96.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	99.00 to	100.00
Rails, 18 in. and under	100.00 to	101.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	89.00 to	90.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	275.00 to	285.00
18-8 turnings	225.00 to	235.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 31.00 to	$ 32.00
No. 2 hvy. melting	21.00 to	22.00
No. 1 busheling	36.00 to	37.00
No. 1 dealer bundles	34.00 to	35.00
No. 2 bundles	18.00 to	19.00
Machine shop turn.	7.00 to	8.00
Mixed bor. and turn.	14.00 to	15.00
Shoveling turnings	16.00 to	17.00
Cast iron borings	13.00 to	14.00
Low phos. plate	54.00 to	55.00
Structural and plate, 2 ft. and under	52.00 to	53.00
Rails, 2 ft. and under	48.00 to	49.00
Scrap rails, random lgth.	28.00 to	29.00
No. 1 machinery cast	69.00 to	70.00
No. 1 cupola cast	46.00 to	47.00

St. Louis

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	50.00 to	51.00
Foundry steel, 2 ft.	50.00 to	51.00
No. 1 dealer bundles	58.00 to	59.00
No. 2 bundles	47.00 to	48.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	58.00 to	59.00
Rails, random length	55.00 to	56.00
Rails, 18 in. and under	70.00 to	71.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	76.00 to	77.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	90.00 to	91.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 56.00 to	$ 57.00
No. 2 heavy melting	52.00 to	53.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	40.00 to	41.00
No. 1 busheling	54.00 to	55.00
Shredder scrap	72.00 to	73.00
Machine shop. turn.	18.00 to	19.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	53.00 to	54.00
Elec. furnace, 3 ft. & under	50.00 to	51.00
Structural and plate, 2 ft.	73.00 to	74.00
Structural and plate, 4 ft.	69.00 to	70.00
No. 1 RR hvy. melting	55.00 to	56.00
Scrap rails, random lgth.	57.00 to	58.00
Rails, 18 in. and under	76.00 to	79.00
Angles and splice bars	67.00 to	68.00
No. 1 cupola cast	76.00 to	77.00
Unstripped motor blocks	52.00 to	53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 dealer bundles	59.00 to	60.00
No. 2 bundles	30.00 to	31.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	11.00 to	12.00
Low phos. 18 in. and under	78.00 to	79.00
Rails, random length	60.00 to	61.00
Rails, 2 ft. and under	82.00 to	83.00
No. 1 cupola cast	65.00 to	66.00
Heavy breakable cast	29.00 to	30.00
Drop broken cast	69.00 to	70.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 31.00 to	$ 32.00
No. 2 hvy. melting	27.00 to	29.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	410.00 to	425.00
18-8 turnings	300.00 to	325.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	40.00 to	42.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	40.00 to	42.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	27.00 to	29.00
No. 1 dealer bundles	25.00 to	27.00
No. 2 dealer bundles	8.00 to	10.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 55.00 to	$ 57.00
No. 2 hvy. melting	44.00 to	46.00
No. 2 bundles	33.00 to	35.00
No. 1 cupola cast	90.00 to	92.00
Mixed yard cast	78.00 to	80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 43.00
No. 2 heavy melting cut 2 ft. and under	40.00
No. 1 dealer bundles	50.00
No. 2 bundles	10.00
Mixed steel scrap	24.00
Bush. new fact. prep'd.	48.00
Bush. new fact. unprp'd.	40.00
Machine shop turn.	23.00
Short steel turn.	26.00
Mixed bor. and turn.	15.00
Cast scrap	40.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	49.00 to	50.00
No. 2 bundles	34.00 to	36.00
Machine shop turn.	18.00 to	19.00
Crushed turnings	33.00 to	35.00
Shredder scrap	64.00 to	65.00
Cut structural plate 2 ft. and under	84.00 to	86.00
Unstripped motor blocks	60.00 to	62.00
Cupola cast	69.00 to	71.00

METALWORKING ORDER TRENDS

At last, the clouds pass and the sun comes out again

It has been a long wait for many metalworking industry executives.

But it finally happened in December and January—there were two straight months of solid gains in new orders volume.

In the closing month of 1982, durable goods new orders rose a super-strong 8.5 pct from the previous month. And in January, those orders rose a strong 5.4 pct—from $76.6 billion to $80.7 billion.

Most metalworking executives will probably hail that two-month showing as the start of a business recovery. A number of economists, on learning of the latest orders trends, have coupled it with other recent data and agree that a recovery has started.

For the five major metalworking industry groups listed on the table here—primary metals, electrical and nonelectrical machinery, transportation equipment, fabricated metal products and instruments—the January gain was a slightly more moderate 4.4 pct. Only makers of electrical machinery showed an orders dip in January.

Commerce Dept. analysts, in announcing the latest orders data, made a point of noting that if orders for defense industries' capital goods are excluded, then durables new orders in January would have gone up a resounding 10.5 pct.

But these defense capital goods orders still looked strong in January. It is just that December had an explosion in defense goods orders when they more than doubled from $6.6 billion in November.

There was another message on capital goods orders that emerged in the January data. Summed up the Commerce Dept. announcement: "The January increase in orders was predominantly in noncapital goods items . . ." This trend feature is in line with a widely-forecast cyclical lag in capital spending as recovery takes hold. It now looks like nondefense capital goods orders—now 19 pct below their cyclical high of $25.7 billion in April 1981—will not show any sustained rise until the summer, or sometime soon after that.

Metalworking industry orders were not only up in January on a month-to-month basis, but for the first time in many months they were up from year-ago levels. Orders of $68.4 billion in January were up about 7 pct from the same month last year—another sign of recovery.

Source: U.S. Dept. of Commerce Billions of dollars, seasonally adjusted monthly total, unless otherwise noted	Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
Capital Expenditures (Annual Rates)			
U.S. Industry, Total	1st Qtr.	$316.4*	$315.2	$327.7
Manufacturing, Total	1st Qtr.	121.4*	120.5	126.3
Manufacturing, Durable Goods	1st Qtr.	57.9*	55.8	60.8
Mining Industry	1st Qtr.	16.2*	15.6	17.6
Key Indicators, Durable Goods Manufacturing				
New Orders	Jan.	80.7	76.6	75.1
Shipments	Jan.	77.0	73.4	75.6
Inventories	Jan.	174.0	177.0	187.1
Unfilled Orders	Jan.	288.8	285.1	307.9
New Orders, Metalworking				
Capital Goods Producers, Nondefense Industries	Jan.	20.9	20.2	21.7
Capital Goods Producers, Defense Industries	Jan.	8.6	11.3	6.6
Primary Metals, Total	Jan.	8.3	6.7	9.2
Steel (SIC 331)	Jan.	3.5	2.5	4.5
Iron & Steel Castings (SIC 332)	Jan.	.8	.7	.6
Nonferrous Metals	Jan.	4.0	3.5	3.9
Nonelectrical Mach.-Equip. Industries, Total	Jan.	13.4	12.5	15.1
Engines & Turbines	Jan.	1.0	.3	1.2
Farm Machinery & Equipment (Shipments)	Jan.	.9	1.0	.9
Construction, Mining & Materials Hdlg. Equip.	Jan.	1.9	1.9	3.0
General Industrial Machinery	Jan.	1.1	1.2	1.4
Fluid Power Equipment** (Index-1972=100)	Jan.	209	155	216
Metalworking Machinery	Jan.	.7	.6	.8
Machine Tools, Total (Millions $, unadjusted)***	Jan.	91.6	121.0	205.2
Machine Tools, Metal-Cutting***	Jan.	57.6	85.8	156.0
Machine Tools, Metal-Forming***	Jan.	34.0	35.2	49.2
Electrical Mach. & Equip. Industries, Total	Jan.	12.0	12.5	11.8
Elec. Transmission Equip. & Industrial Apparatus	Jan.	1.4	1.7	1.8
Household Appliances	Jan.	1.3	1.0	1.0
Communication Equipment	Jan.	4.0	4.8	3.6
Transportation Equip. Industrial, Total	Jan.	21.7	21.7	15.2
Motor Vehicles & Parts (Shipments)	Jan.	10.4	8.6	9.0
Aircraft, Missiles & Parts	Jan.	8.9	7.4	5.8
Shipbuilding & Military Tanks	Jan.	1.6	5.0	1.5
Fabricated Metal Products, Total	Jan.	9.0	8.4	8.8
Instruments, Total	Jan.	4.0	3.7	3.9

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA

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THE MAGAZINE FOR METALWORKING MANAGEMENT

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MANUFACTURING SYSTEMS SERIES 38:

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EXCLUSIVE INTERVIEW: SENATOR JOHN HEINZ TALKS ABOUT IMPORT LEGISLATION

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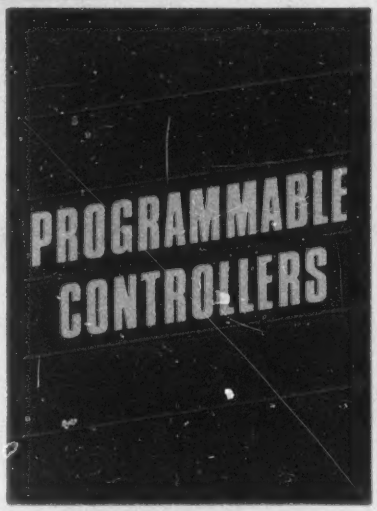

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Second quarter forecast: Something to shout about

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EFFECTIVE MARCH 14, 1983

MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective March 14, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,566	1,506	13,842	17,720
Capability Utilization Rate	54.0	52.0	47.1	59.3

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.195
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 72.83	$ 73.83	$ 69.83	$ 81.83
No. 2 bundles	$ 51.83	$ 51.83	$ 47.83	$ 56.17
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 77.50	$ 80.50	$ 74.50	$ 90.50
No. 1 steel, Philadelphia	63.50	63.50	63.50	75.50
No. 1 steel, Chicago	77.50	77.50	71.50	79.50
No. 1 bundles, Detroit	76.50	76.50	61.50	83.50
Low Phos., Youngstown	69.50	69.50	69.50	95.50
No. 1 mach'y cast., Pgh	79.50	79.50	66.50	93.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	113.50
No. 1 mach'y cast., Chi	112.50	112.50	109.50	124.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective March 14, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	78.00	78.00-80.00	3/11/83
Lead	20.00-23.00	21.00-23.00	3/2/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00-40.00	40.00	3/1/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.25-$1.40
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $428.50
Indium, dollars per troy oz. ..... $2.60-$2.85
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$330-$355
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $10.73
Vanadium $4.94
Zirconium sponge ..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Mar. 7—588.39
Mar. 8—593.33
Mar. 9—592.83
Mar. 10—594.57
Mar. 11—597.14

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	77½	68¼
Yellow brass	65⅛	61¼
Red brass	70	67⅛
Comm. bronze	72⅝	67¾
Mang. bronze	63⅞	61⅝
Free cutting rod ends	61	60

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	69
No. 2 copper wire	59
Light copper	50

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	65
No. 2 copper wire	55
Light copper	46
No. 1 composition	53
No. 1 comp. turnings	49
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	27
Radiators	43

Aluminum

New mixed clips	34	—35
Old sheet	32	—33
Old cast	32	—33
Clean dry borings	33	—34

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	27	—28
Mixed L.C. clips	24	—25
Old sheets and cast	19	—20
Borings and turnings	13	—14
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	56	—58
No. 2 copper wire	50	—51
Light copper	44	—45
Radiators	37	—38
No. 1 composition	45	—46
No. 1 composition turn'gs	42	—44
Cocks and faucets	32	—33
Clean heavy yellow brass	31	—32
Brass Pipe	31	—32
New soft brass clippings	46	—47

Lead

Heavy soft lead	10	—11
Whole batteries	4	— 5
Type metal	15	—16
Electrotype	17	—18

Nickel

Nickel solids	95	—100
Nickel rod ends	95	—100
Nickel sheets, clips	95	—100
Nickel turnings	45	— 50

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

EFFECTIVE MARCH 14, 1983

MATERIALS NEWSFRONT

(Effective March 14, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 77.00 to	$ 78.00
No. 2 hvy. melting	67.00 to	68.00
No. 1 dealer bundles	91.00 to	92.00
No. 1 factory bundles (auto)	91.00 to	92.00
No. 2 bundles	54.00 to	55.00
No. 1 busheling	91.00 to	92.00
Machine shop turn.	13.00 to	14.00
Shoveling turnings	34.00 to	35.00
Cast iron borings	33.00 to	34.00
Low phos. punchings plate	91.00 to	92.00
Heavy turnings	67.00 to	68.00
No. 1 RR hvy. melting	84.00 to	85.00
Rails 2 ft. and under	94.00 to	95.00
Scrap rails, random lgth.	87.50 to	88.50
RR specialties	83.00 to	84.00
No. 1 machinery cast	79.00 to	80.00
Cupola cast	72.00 to	73.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	540.00 to	550.00
18-8 turnings	440.00 to	450.00

Chicago

No. 1 hvy. melting	$ 77.00 to	$ 78.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	87.00 to	88.00
No. 1 factory bundles (auto)	93.00 to	94.00
No. 2 dealer bundles	54.00 to	55.00
No. 1 busheling	84.00 to	85.00
Shredder scrap	80.00 to	81.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	41.00 to	42.00
Low phos. forge crop	92.00 to	93.00
Low phos. punchings plate ¼ in. and heavier	98.00 to	99.00
Low phos. 2 ft. and under	92.00 to	93.00
No. 1 RR hvy. melting	84.00 to	85.00
Scrap rails, random lgth.	76.00 to	77.00
Reroller rails	101.00 to	102.00
Rails, 2 ft. and under	97.00 to	98.00
RR couplers and knuckles	86.00 to	87.00
RR car axles	109.00 to	110.00
No. 1 machinery cast	112.00 to	113.00
Cupola cast	97.00 to	98.00
Stove plate	94.00 to	95.00
Steel car wheels	86.00 to	87.00
Stainless		
18-8 bundles and solids	515.00 to	525.00
18-8 turnings	415.00 to	425.00
430 bundles and solids	130.00 to	135.00
430 turnings	95.00 to	100.00

Philadelphia

No. 1 hvy. melting	$ 62.00 to	$ 65.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	79.00 to	82.00
No. 2 dealer bundles	45.00 to	48.00
No. 1 busheling	79.00 to	82.00
Shredder scrap	77.00 to	80.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	40.00 to	43.00
Low phos. 5 ft. and under	79.00 to	82.00
Low phos. 2 ft. punchings	91.00 to	94.00
Electric furnace bundles	95.00 to	98.00
RR specialties	79.00 to	82.00
Rails, 2 ft. and under	93.00 to	96.00
Cupola cast	60.00 to	63.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	76.00 to	77.00
No. 2 bundles	32.00 to	33.00
No. 1 busheling	73.00 to	74.00
Drop forge flashings	47.00 to	48.00
Machine shop turn.	29.00 to	30.00
Mixed borings and turn.	14.00 to	15.00
Shoveling turnings	29.00 to	30.00
Cast iron borings	13.00 to	14.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	69.00 to	70.00
Stainless		
18-8 bundles and solids	430.00 to	440.00
18-8 turnings	310.00 to	320.00
430 bundles and solids	120.00 to	130.00

Youngstown

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	79.00 to	80.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	69.00 to	70.00
Electric furnace bundles	75.00 to	76.00
Galvanized bundles	65.00 to	66.00

Cleveland

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	77.00 to	78.00
No. 1 factory bundles	89.00 to	90.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	77.00 to	78.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	95.00 to	96.00
Low phos. punchings plate	95.00 to	96.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	99.00 to	100.00
Rails, 18 in. and under	100.00 to	101.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	89.00 to	90.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	275.00 to	285.00
18-8 turnings	225.00 to	235.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 busheling	38.00 to	39.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.	9.00 to	10.00
Mixed bor. and turn.	16.00 to	17.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	15.00 to	16.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	50.00 to	51.00
Scrap rails, random lgth.	30.00 to	31.00
No. 1 machinery cast	71.00 to	72.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	53.00 to	54.00
Foundry steel, 2 ft.	53.00 to	54.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	50.00 to	51.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	64.00 to	65.00
Rails, random length	61.00 to	62.00
Rails, 18 in. and under	76.00 to	77.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	82.00 to	83.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	96.00 to	97.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 58.00 to	$ 59.00
No. 2 heavy melting	56.00 to	57.00
No. 1 dealer bundles	58.00 to	59.00
No. 2 bundles	43.00 to	44.00
No. 1 busheling	58.00 to	59.00
Shredder scrap	73.00 to	74.00
Machine shop. turn.	21.00 to	22.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	31.00 to	32.00
Electric furnace bundles	58.00 to	59.00
Elec. furnace, 3 ft. & under	56.00 to	57.00
Structural and plate, 2 ft.	75.00 to	76.00
Structural and plate, 4 ft.	71.00 to	72.00
No. 1 RR hvy. melting	59.00 to	60.00
Scrap rails, random lgth.	60.00 to	61.00
Rails, 18 in. and under	78.00 to	79.00
Angles and splice bars	73.00 to	74.00
No. 1 cupola cast	76.00 to	77.00
Unstripped motor blocks	52.00 to	53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 dealer bundles	59.00 to	60.00
No. 2 bundles	30.00 to	31.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	11.00 to	12.00
Low phos. 18 in. and under	78.00 to	79.00
Rails, random length	60.00 to	61.00
Rails, 2 ft. and under	82.00 to	83.00
No. 1 cupola cast	65.00 to	66.00
Heavy breakable cast	29.00 to	30.00
Drop broken cast	69.00 to	70.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	455.00 to	475.00
18-8 turnings	340.00 to	365.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	40.00 to	42.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	40.00 to	42.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 39.00 to	$ 41.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	27.00 to	29.00
No. 1 dealer bundles	25.00 to	27.00
No. 2 dealer bundles	8.00 to	10.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 55.00 to	$ 57.00
No. 2 hvy. melting	44.00 to	46.00
No. 2 bundles	33.00 to	35.00
No. 1 cupola cast	90.00 to	92.00
Mixed yard cast	78.00 to	80.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 43.00
No. 2 heavy melting cut 2 ft. and under	40.00
No. 1 dealer bundles	50.00
No. 2 bundles	20.00
Mixed steel scrap	24.00
Bush. new fact. prep'd.	48.00
Bush. new fact. unprp'd.	40.00
Machine shop turn.	23.00
Short steel turn.	26.00
Mixed bor. and turn.	15.00
Cast scrap	40.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	49.00 to	50.00
No. 2 bundles	34.00 to	36.00
Machine shop turn.	18.00 to	19.00
Crushed turnings	33.00 to	35.00
Shredder scrap	64.00 to	65.00
Cut structural plate 2 ft. and under	84.00 to	86.00
Unstripped motor blocks	60.00 to	62.00
Cupola cast	69.00 to	71.00

APRIL 4, 1983

IRON AGE

THE MAGAZINE FOR METAL PRODUCING MANAGEMENT

4/5/83
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A REVIVAL IN LACKAWANNA

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DIRECT REDUCTION:

MORE NEW TECHNOLOGY, BUT DEMAND STILL SPUTTERS IN THE U.S.

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VOL. 226, NO. 10

IRON AGE

APRIL 4, 1983

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New reduction projects lagged in 1982, but there is considerable fresh activity on the horizon now.

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Knoxville Iron is saving 10 million kwh a year by preheating its electric furnace scrap in a process termed "very simple."

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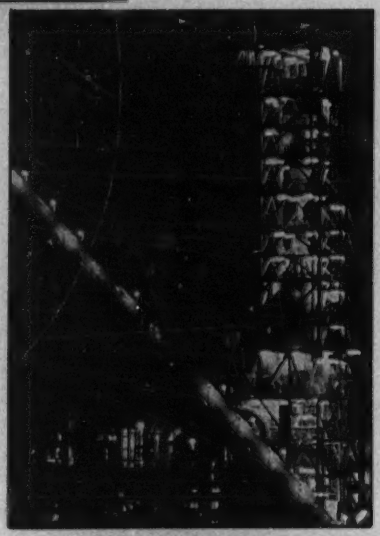

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NEXT ISSUE

Can high tech turn us around?

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RECOVERY—

It's come. But many metalworking companies have seen few, if any, signs of it yet. The recovery will soon widen, but many question its staying power.

Along with spring this year has come business recovery.

Actually, it looks like the recovery may have started back when the snows of late winter were piling up.

By no means, however, is this recovery showing signs that it will 'jump out of the chute' as have most past recoveries.

The U.S. Commerce Dept. estimates that the U.S. economy grew at an annual rate of about 4 pct in the first quarter this year. And a number of top economists are looking for second quarter growth at close to that rate.

By way of comparison, the economy bounded out of the 1973-75 recession with annual rate jumps of 4.9 and 9.2 pct in the first two quarters of recovery. And in the first quarter of recovery following the 1969-70 recession, recovery leaped ahead at a 10.3 pct growth rate.

There is, however, one resemblance in the early stage of the current recovery to early stages of those in the past—it is impacting unevenly on the economy.

As one economist puts it, "Not everyone has yet been seated at the banquet table."

At this time, many in metalworking companies feel they are among those "not yet seated." That feeling is made clear in some of the individual industry probes made by *Iron Age* editors in the pages following this economic overview of the likely look of first half 1983.

Executives in a number of metalworking sectors still face long lines of idle equipment, trickling inflows of new orders and depressed earnings.

Playing the 'waiting game' is a role familiar to veteran metalworking industry executives, especially those in capital goods lines. It happens in every business recovery cycle.

Still, recovery seems clearly underway. It is rubber-legged and uncertain at this stage, but moving ahead. Like most recoveries in their fledgling days, this one will likely follow the pattern of running, falling and getting back up. Typically, it can be expected there will be setbacks in some important economic indicators in the months just ahead.

The real doubts about the current recovery are centered in its likely staying power. The greatest threat to recovery longevity, it seems agreed, is the huge size of the Federal budget deficits—and the possible lack of will of political leaders to come to grip with them. The financing of these presently projected deficits, it is widely perceived, would lead to recovery-wrecking sky-high interest rates.

But first, what are the signs that a business recovery has started?

Perhaps the one great clear signal of recovery was the massive runoff of business inventories in the closing quarter of last year. In the biggest one-quarter inventory reduction in history, some $44 billion in stock was liquidated. And history shows that sharp inventory cutting is the classic 'starting gun' in any run towards business recovery. This time, the stock cutbacks sounded like a 'starting cannon.'

The inventory cutting, as might be guessed based on its magnitude, was widespread throughout industry. Notably, inventory/orders ratios in durable goods manufacturing have fallen steadily since November. (See chart.)

Another key sign of recovery is the recent turnaround in indus-

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trial production. In the playbooks of some economists, the trough of a recession is signalled 'officially' when declines in industrial output comes to an end. In hindsight looks, they have found that such turns coincide closely with the timing of formally declared cyclical troughs.

This fall in output appears to have halted in November of last year. Production in the nation's factories, mines and utilities rose in each of the following three months.

Backing up the recovery in production was an increase in manufacturing plant capacity utilization for 3 straight months through February. This usage rate was up after declining in 15 out of the previous 17 months.

Another sign that spells recovery is the new life shown in key consumer markets. The talk among home builders is all about recovery—and even strong recovery. The near-10 pct rise in sales of single homes as the year started—to the highest level in 28 months—has been but one of several signs of recovery in housing. February housing starts were up 93 pct from the year-ago level.

There will be some setbacks; that is just the way housing is. But recovery signs are so sure and so strong that the National Assn. of Home Builders is forecasting a 30 pct rise this year over 1982 in sales of single homes.

There has been little mystery as to the 'why' behind the housing rally. It is pretty much the same reason as for autos. Interest rates have fallen. And that has been like the opening of floodgates for those big-ticket consumer markets.

Interest rates on mortgages last summer were running between 17 and 18 pct. Now, rates are down to 11 to 13 pct.

The implication for the recovery in the big gains in housing comes through with a bright neon glow. The builders' association now expects some $63 billion to be spent on construction of new homes in 1983.

A turning point in slowly-recovering auto sales was sparked by similar interest rate cooling. Things have been more favorable for auto sales since auto makers came up with their 11.9 pct financing rate lure.

Falling interest rates alone didn't turn the tide in consumer buying of houses and autos. Inflation cooled, too. Last year, for the first time since 1978, real income of U.S. wage earners was up.

The recovery signs in autos and housing are not likely to become gone-tomorrow spurts. Consumer spending, despite some recent softness in retail sales, has been getting stronger for some time. Total consumer expenditures rose by 4.8 pct at an annual rate in the closing quarter last year—more than double the average rate of increase for the three previous quarters.

Too, Federal income tax refunds, averaging nearly $700 each and numbered in the millions, have started to flow out to consumers. In addition, as of July 1, their income taxes will be cut 10 pct. The timing of these boosts to consumer spending power couldn't be better in giving a helping hand to the wobbly-knee recovery.

It is little wonder then that surveys these days are showing a more optimistic, more in-a-buying-mood consumer. Noted the Conference Board last month in announcing its latest consumer survey, "U.S. consumer confi-

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dence registered a solid gain . . . suggesting that 1983 could be a better year than many analysts have projected."

The board found its 5000 surveyed households, "significantly more optimistic."

Not to be overlooked in pinning the label 'recovery' on the economy is the string of five straight months rise in the composite leading economic indicators. Notably, the rise in January was the biggest in 33 years. Sure, this indicator may slip a month or two in coming months, but it still looks like a new trend has made a strong start.

Corporations as well as consumers are becoming stronger more quickly in the recovery environment than many had thought likely.

Analysts at Chase Manhattan Bank recently noted, "Corporate balance sheets have improved dramatically, so that any future gains in income can be used to finance new spending rather than pay off old debts."

That development, of course, speaks well for the recovery 'catching on' in the economy.

Lastly, it might be said that economic recovery worldwide both confirms and strengthens the U.S. recovery.

Noted the Conference Board in a recent analysis of the international economy, "The prolonged worldwide economic slump appears to be ending, with recovery underway in the world's 7 major industrial countries."

In February, the board found, that for the first time since August 1981, leading indicators grew in all 7 countries—U.S., France, United Kingdom, West Germany, Italy, Japan and Canada.

Summed up the board report, "Latest growth rates (in leading indicators) in the U.S. and the other six major countries spell economic recovery in any language. A U.S. recovery will boost prospects for many developing and developed countries. Similarly, a recovery in other nations will strengthen the upswing in the U.S."

The final arbiter in deciding just when the 1982 recession ended and recovery started will be the National Bureau of Economic Research (NBER). This private sector group of top economists, which has long been the official referee on such matters, will wait some time before making its decision on the timing point of the latest business cycle.

However, Martin S. Feldstein, just prior to recently being named chairman of the President's Council of Economic Advisers, was head of NBER. And last month he said he expected the economy to grow by "about 5 pct" from fourth quarter 1982 to the closing quarter this year.

That's recovery. After all, between the same periods of 1981 and 1982, there was negative growth of 1.1 pct.

Most metalworking industries will likely be lifted onto the recovery bandwagon by late in this quarter or sometime in the third. Even badly-lagging capital goods producers will likely see some light in the last half of the year.

When the U.S. Commerce Dept., in late January and February, asked some 8000 business executives about their plant and equipment spending plans for 1983, it was told they would cut them back by 3.8 pct from last year. That's after adjustment for inflation. And it would follow a real decline last year in plant outlays of 5.5 pct.

'The budget deficits are bigger, relatively, than the iceberg that sank the Titanic.'

The surveyed executives, however, said they would be moderately stepping up their plant spending during the last half of the year.

This is in line with a number of forecasts of capital spending analysts who see a second half turning up of the expenditures curve.

But 1983, as a whole, will likely end up with negative growth for these outlays. The plus figures are expected to come too late this year to make the year as a whole a plus one for investment growth.

A hopeful sign for plant spending: Capital appropriations of the 1000 largest manufacturing companies were up 12.5 pct in the closing quarter of last year, according to the survey report of the Conference Board released last month.

But even in making that announcement, the board noted that "the capital invesment outlook remains subdued for 1983."

Simply, executives find little reason to boost their capital spending. Many plants are idle, corporate earnings are weak. And real interest rates on long-term bonds—a prime source of plant spending funds—are at all-time record high levels.

Even though the overall U.S. economy appears to be in a recovery stage at this time, there are probably more non-believers around than during any economic transition period in many years. Reservations and caveats about recovery fill the air. Sums up one analyst, "The staying power of this recovery is highly suspect."

There's good reason for all the crossed fingers and bet-hedging.

The U.S. economy has been on a stop-go roller-coaster for a long time now. A result is that output of the economy is less today, in inflation-adjusted terms, than it was back in the third quarter of 1979. More than that, 7 of the last 10 years have been marked by sub-par economic growth—with four of those years actually showing negative growth.

To top all that off, the last recovery (1980-81) was the **shortest** since 1921; the last recession (1982-83), the **longest** since the 1930's.

This time around, on the recovery side, there are great worries about the biggest Federal budget deficits in history. "Bigger relatively," says one economist, "than the iceberg that sank the Titanic."

Too, the international financial situation is shaky. The quote of the late President John F. Kennedy is heard often these days in way of reminder, "The only two things I really fear are nuclear war and an international financial collapse."

But, overwhelmingly, the huge budget deficits are seen as the great black cloud hanging over the recovery.

The Federal government is already vacuuming up about one-half of the nation's available credit—and the borrowing to finance upcoming $200 billion-plus deficits hasn't even yet started. Nor has the demand for credit by the private sector yet started to swell mightily—as it certainly will as business improves.

If this big-deficit scenario is played out, then interest rates could go through the roof. And in the minds of many executives and economists, that would mean curtains for the struggling recovery.

They see all this happening if the Federal government doesn't do something soon, and in a big way, about trimming these deficits.

Still, the fears are just that—fears only—and focus on the future. The recovery seems real enough and is here now.

So, in putting facts ahead of fears, it can be said that the outlook for U.S. business over the span of the next two or three quarters looks good.

John Baxter

Steel

The steel industry turned the corner in the first quarter of 1983.

After declining for six straight quarters, steel shipments in the first three months of this year rose to 15 million tons.

A further gain to about 19 million tons is indicated for the second quarter. The outlook is a little cloudy because it isn't known how much orders placed in January and February were influenced by price increases and uncertainty about the labor situation.

However, it appears that the steel market has had about one-third of a recovery. Steel shipments averaged 5 million tons a month in 1982 and fell as low as 4 million tons a month in the second half. Shipments are now running at the rate of 6 million tons a month. In a reasonably good year, the steel industry should ship 8 million tons a month.

With business showing some improvement, steel labor costs have gone down for the first time in recent history. The contract signed March 1 will reduce compensation about $1.50 an hour. If this is combined with a real surge in volume, the effect would be dramatic. So far, there is no sign of such a surge.

The recovery is based on a slowing of inventory cuts and better business in consumer markets. The auto industry is selling and building a few more cars. The rise in housing starts has boosted appliance activity.

Sheet products have gotten a big lift from the auto industry. By March, producers of galvanized sheet were scheduling 20-turn operations. There has been a sharp rise in orders for stainless flat rolled.

The inventory situation is mixed. In auto-related areas, steel stocks have probably been stabilized. In the oil country market, it will probably take another 9 to 12 months to run off surplus pipe and tube inventories.

Still to be heard from is the capital goods sector. Things are still dead for farm equipment, construction equipment, freight cars and machinery. It's expected the lag will continue until some real strength emanates from the auto industry.

The general view is that capital spending will revive in the second half. That has to happen if steel shipments are to reach the modest targets projected for 1983. In the first half, the industry will ship 35 million tons or less.

With the auto model slowdown and other factors, the second half of the steel year is normally worse than the first half. The assumption in 1983 is that the capital goods recovery will override the seasonal effect and the second half will see rising demand.

If that doesn't happen, the year will fall short of the 72 million tons predicted.

Volume is obviously the key to steel solvency. The industry shipped 60 million tons last year and lost over $3 billion. Assuming the new labor contract reduced compensation $1.50 an hour, the same volume would leave the industry still in the red—to the tune of $2 billion.

Each added ton would help, both by increasing the labor cost saving and by helping to firm up prices. The mills increased their published prices for sheets and bars in February. It will take considerably more demand for the industry to be able to collect the published prices.

One source of happiness for domestic mills is the apparent easing of steel imports. For the last two months reported, only a little over 1 million tons of steel were imported. That compared with nearly 2 million tons a month in peak 1982 months.

This could be just a temporary lull. January imports reflected orders placed in late 1982 when demand was at a low point. The closing of the St. Lawrence Seaway in the winter normally slows the foreign flow.

However, mill officials report a lessening of foreign competition for current business. That is true of carbon steel and also of stainless flat rolled. There are still problems in the weak stainless bar and wire markets.

There are good reasons for foreign producers to exercise restraint. Final action on specialty steel injury cases is due July 4. An import surge just prior to the decision would invite harsh restraint.

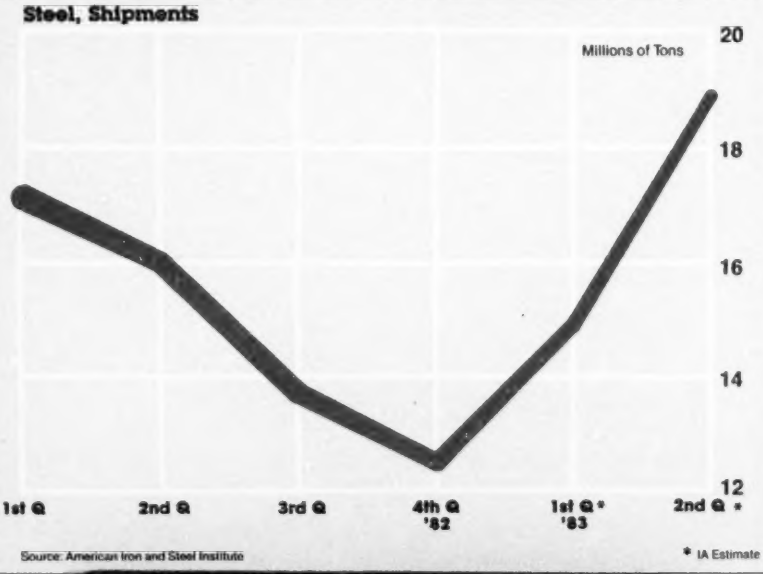
The specialty steel market is a state of delicate balance. Apart from the resolution of the import question, stainless producers are waiting to see how cost and price pressures will balance out. Demand for stainless sheet and strip has risen sharply. The mills are getting more business from flatware and appliance companies as well as from auto plants and service centers.

At the same time, prices of nickel, chromium, and scrap are going up. It remains to be seen if the stainless market is strong enough for these costs to be passed on. It also remains to be seen if the stainless order surge of recent months has some element of price "hedging" in it.

If the specialty import case brings limits on foreign shipments, that will take some of the pressure off stainless prices. It doesn't necessarily follow that these prices will go up. Stainless flat rolled prices were generally stable during the period of import quotas from 1976 to 1979.

Stainless bar producers face a grim prospect. There has been little or no improvement in their orders. It's unlikely that bar imports will be rolled back enough to relieve price pressure. And like sheet mills, the bar producers are being hit with rising raw material prices.

Steel, Shipments



Source: American Iron and Steel Institute

* IA Estimate

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Nonferrous

The begrudging nature of the economic recovery to date underscores projections by many nonferrous metals producers. Many of the industry's members put demand—and more importantly, consumption—on the comeback trail some time in the third or fourth quarter of 1983.

The freshet of favorable business developments, such as the upturn in housing and OPEC's retreat on published prices for oil, lent a firmer tone to market prices for aluminum, copper and nickel during the first quarter.

It was difficult to determine, however, how much of the buying reflected a better chewup rate. The upward price move either paused or turned a bit sour in mid-March for aluminum and copper.

Copper prices had risen roughly 15¢ a lb from depressed end-1982 levels despite a relentless increase in hedge market inventories before profit-taking set in. Increased housing starts, signs of improvement in the appliance sector, and the correction of downward drift in the automotive output and other parts of the economy contributed to the copper gains.

Price trends in the second quarter are likely to be determined by the drift of labor negotiations in the copper industry this spring. Current three-year contracts expire at mid-year and the usual pattern is a settlement following a lengthy strike. The producers emerged from the 1980 strike with a lot of lost production and sales that were difficult to make up as the economy slipped into the recession.

While copper producer stocks moved higher last year despite substantial production cuts by U.S. companies, consumers took their reduced requirements on a hand-to-mouth basis. How much consumer inventory rebuilding took place in the first quarter of this year during the price runup is hard to determine, but some producer sources said they didn't think it was significant. That could mean a busy second quarter for the copper producers, if the business recovery continues at even its current wary pace and soundings from the copper labor scene hint at another strike. The recent recession, plus less than robust first half prospects, haven't left much weight for copper labor or management to throw around, however.

A quickening of the pace of incoming orders for aluminum during February and early March has been tied, at least in part, to the upcoming wage bargaining sessions to replace the three-year pacts that run out May 31. Unlike copper, aluminum's record has been one of minimal work stoppages, particularly at the smelter level. The three major U.S. producers were unsuccessful in attempts to draw any concessions from labor late last year, however, and no one in the industry wants to predict how this year's negotiations will go. But, with profitability elusive through the first half and with a lot of capacity still idled, neither aluminum labor or management have much weight to throw around either.

Free market aluminum prices jumped about 33 pct to about 60¢ a lb by early March despite a steady runup in London Metal Exchange warehouse stocks. A lamb-like trend began developing by mid-month, with the spot price retreating toward 55¢ a lb. Some of the early strength reflected ingot buying by producers who found this approach more economical than restarting idle smelter capacity. Another advantage was that this helped dry up some of the surplus metal on the L.M.E. and the merchant market generally.

A lot of the L.M.E. stock was Eastbloc metal sold to raise foreign exchange after a protracted run of grain crop failures in Russia. The downtrend in oil prices reduces the Soviet Union's foreign exchange earning capacity from that source and raises the possibility that more aluminum, platinum, gold and nickel will have to be sold instead.

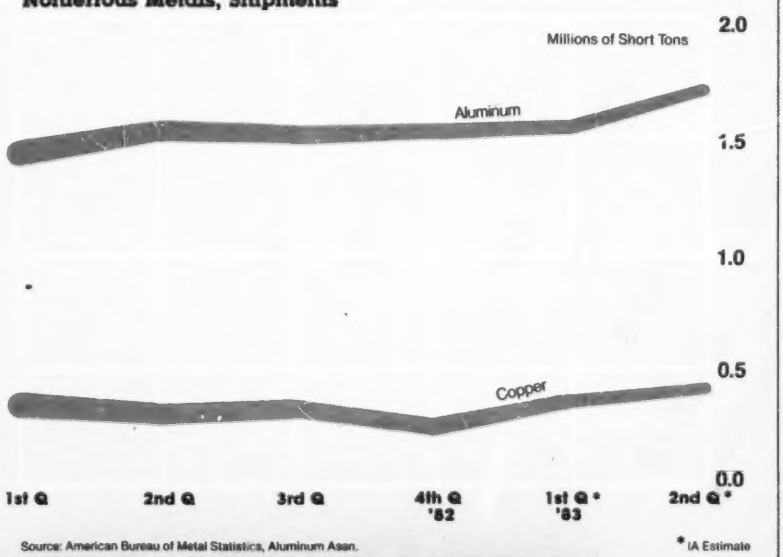
Like aluminum and copper, nickel prices have moved higher, mainly on the L.M.E., despite a steady rise in exchange warehouse stocks to about 25 million lbs, nearly double the stock at the start of the year. Industry sources said there has been some improvement in demand at the consumer level.

Some of the improved demand reflected a measure of improvement in the consumer goods sector and some reflected spotty inventory filling by nickel users. Producers have maintained a tight rein on production but, while consumers may be having some difficulty getting quick service on fair-sized spot purchases, the producers still are able to handle longer-term contract business easily.

The lead industry finished 1982 with a 5.1 pct gain in shipments on a poor 1981 showing. The winter of 1982-83 failed to produce the sort of weather that takes a heavy toll on automotive storage batteries and the producers' inventories were still on an uptrend as the first quarter began. Battery industry sources are looking for a shipment gain of from 3 to 4 pct this year on a poor 1982 showing. The price of lead wobbled a bit in the first quarter, but remains depressed.

The zinc industry sustained a drop of nearly 19 pct in shipments last year and shipments didn't exactly get off to a flying start in the first quarter of 1983. Lower production helped keep the zinc producers' inventories in check—as did last year's shift to the zinc penny—but real recovery won't come until domestic auto production and sales show more signs of life.

Nonferrous Metals, Shipments



Source: American Bureau of Metal Statistics, Aluminum Assn.

*IA Estimate

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QUARTERLY FORECAST

Auto

U.S. automakers expect to sell 1.6 million cars this quarter. That would be the strongest quarter since the third quarter of 1981.

U.S. automakers likely will produce 1.7 million cars in the second quarter of 1983, 200,000 more than the 1.5 million in the first quarter.

By contrast, U.S. car production in the second quarter of 1982 was 1.57 million; in the first quarter of 1982, 1.07 million.

Automakers expect sales to rise more in the third and fourth quarters of 1983. That could raise total sales of domestic cars in 1983 to 6.3 million, about the same as in 1981.

Who ever thought the automakers of 1983 would be happy to equal the sales of 1981 and would view the sales of 1980 (6.6 million domestic cars) as high? By contrast, automakers sold 8.3 million domestic and 2.3 million imported cars in 1979.

Many auto analysts doubt that U.S. sales of domestic and imported cars in any year will exceed 9 million in this decade. If so, the auto industry will *not* be the segment of the U.S. economy that leads a recovery.

Total U.S. car sales in 1980 were 9 million; in 1981, 8.5 million; and in 1982, 8 million. Total sales for 1983 likely will be 8.6 million, including 2.3 million imports.

Since 1979, import sales each year have been 2.3 million or 2.4 million. This is due mainly to the voluntary restraint by the Japanese.

"This year," says the sales analyst of one Big 3 automaker, "there's a 20 pct chance there will be a real recovery, with sales near the levels of 1979. There's a 30 pct chance of a modest recovery; but a 50 pct chance of the slogging improvement we've had since hitting the low point of 1.3 million domestic sales in the fourth quarter of 1981."

To be sure, the chairman of one Big 3 automaker expects the best: an annual rate of 14 million car and truck sales by the fourth quarter of 1983. That would equal the sales rate of 1979.

Sales in April and June 1983 likely will exceed those of April and June 1982. Sales in May 1983 will be higher than those of April 1983, but lower than those of May 1982.

At the end of March 1983, automakers plan to end their 11-pct financing programs. Sales will drop from March to April, as they did the same time last year, for the same reason.

Since automakers this year will maintain production levels, inventory will rise from a 58-day supply at the end of March to a 72-day supply at the end of April.

Sales and production likely will be about the same in May. In June, automakers may cut production to cut inventory to a 65-day supply.

Machine Tools

The United States machine tool industry began 1983 on a sorry note. January orders were 55 pct below that month a year before. Shipments were down 60 pct in January '83 from January '82.

And the industry's backlog continued to fall, also, which is bound to weaken this year's shipments.

The second quarter of 1983 may show a slight increase over the first, but still far below last year's figures.

And any real turn around is still far in the future. All the factors which made 1982 a bad year are still present. The recession continues, although some see indications of an upturn. U.S. industries are far away from being in a position to make substantial capital investments.

And foreign competition still looms as large a threat as ever.

There are some positive signs, however. Defense orders are beginning to be felt by the tool builders. And, with a strong defense budget will come more orders.

There is substantial growth predicted in the machine tool rebuilding market, just because of the age of the current machine tool population. If there is no capital for new machinery, the old must be upgraded.

It is possible to take an old machine tool, add new controls and new hydraulics and bring it up to the performance level of a new tool—for a fraction of the price of a new machine. Machine tool prices remain high, even now, when price cutting is taking place.

Some distributors see a good order recovery in about five or six months, however some of this recovery will be in foreign tool purchases. U.S. builders will feel this recovery after the "burn-off" of foreign backlogs.

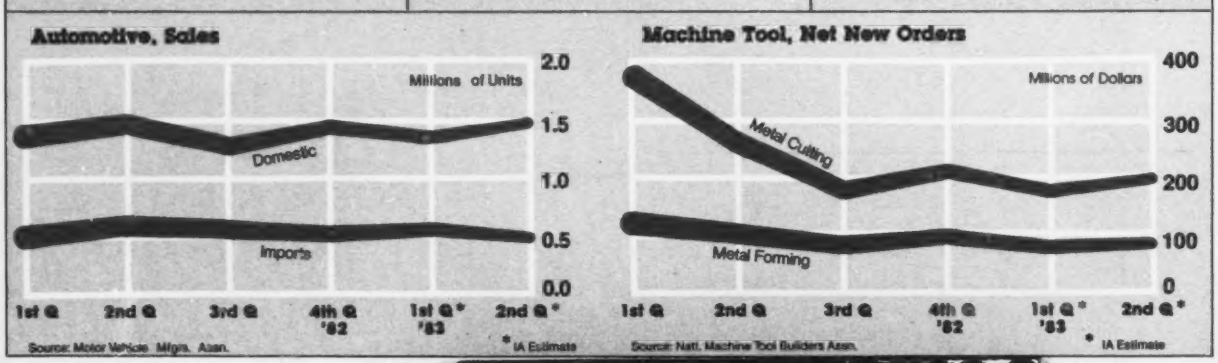
One source believes U.S. builders will see some good order performance in the fourth quarter of this year.

Another positive note comes from a major financial institution which deals in financing machine tool purchases. "Business is increasing rapidly," says this source. And interest is strong both for new equipment purchases, but also for plant expansion.

And, of the orders being quoted and inquiries being received, most include computer numerical control, an indication that the buying companies recognize that automation is the only way to compete.

The export market in machine tools is dominated by the Japanese. U.S. exports weakened in 1982 because of a slump in worldwide economies and the relative strength of the dollar. Exports will continue to weaken.

Mergers and acquisitions will save some smaller companies from extinction and hopefully build stronger, healthier, more competitive companies.



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QUARTERLY FORECAST

Instruments & Controls

Instrumentation and control industries had a poor 1982, and the beginning of 1983 hasn't been great either.

The causes are the same as they have been for so long—the recession has all but halted capital spending and these industries depend heavily on capital spending.

These industries generally lag an economic recovery by six months. Therefore, even though 1983 is expected to be a better year, recovery for these industries will be later than for some others.

Still, there is some optimism. Many controls builders experienced strong inquiry levels throughout 1982, particularly toward the end of the year. These builders feel that buying decisions have been made and are just waiting for the proper economic climate, which should be along shortly.

Some even feel that 1983 will be stronger than predicted, up by more than the 2.5 pct growth in shipments that the Department of Commerce predicts.

It is not surprising that the first segments of the industries to feel increased order activity are those offering smaller, lower priced, stand-alone types of equipment.

Instruments that incorporate electronic technology likewise have been stronger, since they are perceived as contributing to efficiency, productivity and safety.

Measuring and control instruments are the most pertinent to the metalworking industries. Within this sector, industrial process control instruments are the largest. This group has shown the most growth during the last decade.

Sales for these instrument makers grew by 2.7 pct in 1982 and will hold at that rate for the year 1983.

Many modernization programs, which would involve a significant amount of control equipment, have been postponed because of the economy.

With the delay, many of these facilities may never reopen.

Regardless of the timing of the upturn, however, demand for some instruments and controls grow faster than the rest of the economy, particularly products which can reduce energy consumption or improve efficiency without a large capital outlay.

In the manufacturing area, the emphasis is heavily on automation and integration. The so-called factory of the future has created a strong market for communications equipment and for sensors, transducers and transmitters, as well as such control equipment as programmable controllers. Numerical controls, however, are still in a slump, waiting for the machine tool industry to recover.

In general, the first half of 1983 will show some modest improvement. But the second half may be better than was thought—not up to the growth of previous years, but better than the past two.

Computers

Moderate growth marks the domestic computer industry throughout this quarter. The industry began an early recovery from the recession late last year and the upturn continues, however slight. With this continued growth, the industry should finish out 1983 with shipments up almost 18 pct (in 1972 dollars), according to the Dept. of Commerce.

Throughout the recession, certain market segments remained strong. Specifically, personal computers continued a strong growth curve, CAD/CAM's growth stayed above the 30 pct range, and the superminicomputers still felt demand. These types of equipment should be even stronger as the economy strengthens.

Clearly, manufacturing is one of the strongest potential marketplaces for computing equipment of all types. The mainframe computers, although not growing as fast as their minicomputer cousins, are still required to perform the data management and number crunching tasks which manufacturing companies need more and more as they strive to integrate operations.

Minicomputers, particularly the 32-bit variety will be required to take on CAD/CAM activities, production control, perhaps cell control as implementation of manufacturing cells begin.

And microcomputers are and will continue to be found everywhere—behind every control panel and inside every machine. As recovery strengthens, and more capital is freed for investment by computer buyers and product development by machinery builders, the inroads of the microprocessor will be even more dramatic.

"Assuming moderate recoveries in the U.S. and European economies in 1983, computer industry shipments should increase by about 18 pct, after adjusting for inflation. Exports will increase 20 pct," according to government economists.

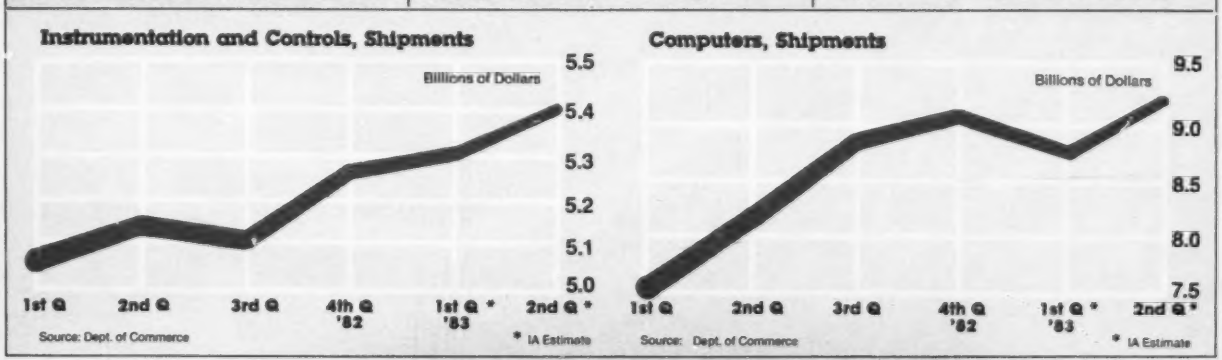
Exports rose only 4.5 pct in 1982, because the European economies were not strong. But imports to this country increased 30 pct.

The slight increase in computer exports and the substantial growth in imports narrowed the U.S. computer trade surplus to $6.7 billion during 1982.

There is a lot of talk about the Japanese competition in the computer industry. How big it is? When it will begin?

Some early inroads have been made in peripheral equipment. And, of course, memory chips are a well known story.

But, with talk of a Japanese super computer and a "fifth-generation" computer effort underway in Japan, some feel that the U.S. builders of computers will soon feel the weight of competition from that country that has so impacted other domestic industries.



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QUARTERLY FORECAST

Metal Coatings

Shipments of industrial product coating materials finished 1982 as had been expected—on the down side. The last quarter of 1982 ended about 7 pct below the same quarter of the previous year and more than 11 pct from the third quarter.

Producers still feel the impact of the slowdown in the heavy paint consuming industries—particularly automotive, housing, farm equipment and earthmoving equipment. Generally, coating material consumption closely parallels the trends in manufactured products.

Therefore, the outlook is beginning to register a glimmer of hope for the remainder of 1983—but only a glimmer. Any upturn in shipments is expected to be slight.

The latest statistics from the producers of coil-coated steel and aluminum are also discouraging in that registered declines in shipments ran between 13 pct and 15 pct. This latest decline reversed an upward trend that the industry had been enjoying, but briefly. The slowdowns in transportation and building products—the two largest consuming industries for coil-coated products—were largely responsible for the decline.

The one bright spot for coil coaters has been in the area of weldable zinc-rich primers which has held its own throughout the recession. But, unfortunately, the same cannot be said for the use of coil-coated products for rural buildings, pre-engineered buildings and appliances. Other major uses, such as those for residential siding, roofing and mobile homes have also declined.

Another area showing promise and holding up well at present is the can and container industry where pre-coated aluminum shipments had been faring well. Coil-coated steel for cans, ends and tabs has also increased in usage recently.

Plastics

Sales and captive uses of plastics resins slipped by about 5 pct in 1982 as compared to 1981. However, the last two quarters of the year were slightly above the same two quarters of the previous year—but only slightly. The final figures for the year show usage for 1982 amounted to some 32.2 billion lbs as compared to 33.9 billion lbs for the previous year.

This annual decline is only the third in a quarter century for the plastics industry.

As some large markets for plastic resins begin to turn around, the plastics industry, too, should rebound—but slowly. Average annual gains of from 10 to 12 pct have been commonplace, but the short-term outlook, through 1983, is expected to be much smaller.

The reinforced plastics/composites segment of the industry had expected a modest gain for 1982, but the year ended on a low note. As the new year started, there was considerable doubt as to whether 1983 would show a turnaround. Some producers reported new orders, but as one industry spokesman put it, "Most were still sitting on their hands."

Within the past month or so, there's a feeling within the industry that "things are beginning to move." They attribute low inventories in many cases as the reason for a ray of hope.

But generally, the feelings are mixed. Some believe that there will be some rebounding from a depressed '82, but the sales will not regain last year's losses. Others—more optimistic—feel that the estimate for '83 has been conservative.

Of the major classes of plastic resins, only high-density polyethylene and thermoplastic polyester have shown modest gains in sales. Others posted declines, some significant—most notably the styrenes.

Fluid Power

Fluid power began to move up a little in the opening month of 1983. The industry is still sitting on its own forecasts, holding them down even though the first half of any calendar year is when the majority of fluid power companies have historically had their strongest business period.

Twice-burned is twice cautious. In 1981, the industry thought it might be recovering, it did not. And, in 1982, while acknowledging things were starting at a slow pace, they expected a strong second half. That did not happen either.

Forecasts are low. Not only for the first quarter but for the second quarter as well. One of the biggest holes in the market prospect is still the mobile equipment market.

While the truck market looks improved, the farm machine and construction machinery markets are still weak enough to discourage all but the hardiest of optimists.

There was an upward blip in the first figures reported for 1983 by the National Fluid Power Association, which has been conservative in its own appraisals of 1983.

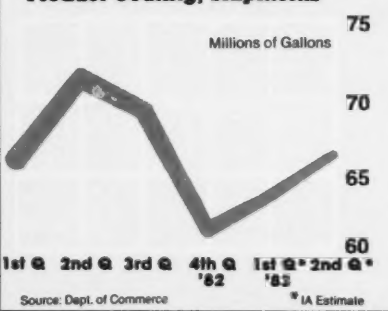
The first reports from 1983 orders suggest that both hydraulics and pneumatics shared in the increase. By one estimate, January orders were running 30 pct of the December period. That sounds better than it really was.

December looks like it was the worst month of the year for pneumatic orders. Hydraulics might have been signalling a slight recovery in December.

However, companies in both pneumatics and hydraulics have reported some December gains.

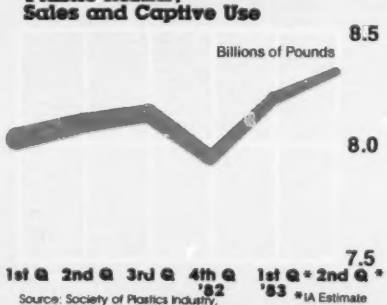
Fluid power companies believe there will be slight gains in second quarter over first, and a dramatic pickup won't hit till the third quarter and maybe not even until the fourth.

Product Coating, Shipments



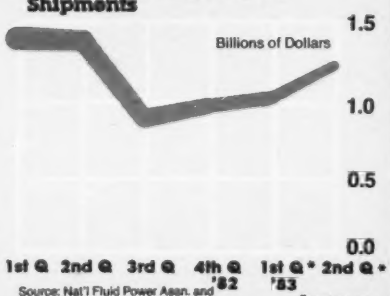
Source: Dept. of Commerce
*IA Estimate

Plastic Resins, Sales and Captive Use



Source: Society of Plastics Industry, Committee on Resin Statistics as compiled by Ernst & Whinney
*IA Estimate

Fluid Power Equipment, Shipments



Source: Nat'l Fluid Power Assn. and Dept. of Commerce
*IA Estimate

QUARTERLY FORECAST

Construction

There's a mild wave of hope in the ranks of construction machinery builders. Since January, there have been a few signs that the worst is over, that contractors and home builders are beginning to crawl up out of the trenches and advance again.

One of the first rays of fresh hope came from CIT Corp., the big financial company, which has been polling contractor opinion for the last seven years. (It accurately predicted the deep slump of 1982, at a time when many still expected 1982 to show a strong second half.) This time, CIT's poll finds contractors expecting a recovery in 1983, by a surprisingly strong majority.

But marketing and manufacturing managers out in the construction machinery plants are also sounding a little more ready to bet on increased sales in 1983—even if the increase is minor.

Partly this is due to some new legislation. Anticipation of the increase in the gasoline tax to fund more highway rebuilding began to kick up some equipment orders in the roadbuilding group as January.

Another surprising development: Marketing managers, who see only slow gains this year (or none) in factory sales of construction machinery, are sitting on some plant and production managers who want to manufacture more equipment. So far, this minor battle hasn't been resolved. A few have made minor upward production adjustments, but they are still a minority.

And with the industry leader, Caterpillar Tractor, still strike-bound in March, these slight gains at other companies haven't produced much new business for their vendors.

One other positive note: For the first time in a year, prices have begun to stabilize, despite the cut-rate used equipment bulge.

Farm

If any industry in the U.S. is in worse shape than the construction machinery builders, it has to be farm equipment.

While press attention has centered on Massey Ferguson and International Harvester and their battle to reduce debt, the entire farm equipment industry has survived a sales drought that last year pulled tractor sales down 32 pct and a crushing 44 pct decline in self-propelled combines. These are the two biggest dollar items the farm machine industry produces.

The industry has a long way to come back. The first hint that it might was the 31 pct increase in combine sales this past January. Nevertheless, tractors are still off, and most equipment is still badly down at the retail sales level. There's a tendency to play down that combine sales surge, however, as a move by a few big companies to get their combine inventory down with price cuts.

The first reports of the impact of the "Payment-In-Kind" program said that this would also hurt farm machine builders on the short run. If a farmer can get grain from government reserves, he doesn't need to grow his own. So, he won't need new equipment.

Now, there's a little more positive side to the PIK idea, however. Marketers argue that a farmer buys machinery on cash flow.

If he gets money, whether selling PIK grain or his own grain, he's more apt to look for new, more efficient machinery.

As in construction machinery, an argument is developing between plant production teams and the market analysts. The production managers say plant inventories are getting low. Marketers want production kept on hold, because they believe the industry faces two lean sales quarters ahead.

Mining Equipment

"Right now, I don't really much care about the national debt. And, personally I don't much care about El Salvador either," says one coal industry equipment supplier. "What I care about is the coal mining industry and, as everyone knows, the country got off easy this year as far as weather is concerned. We don't like deficit financing in Washington in this business. But a warm winter is even worse for us," he adds.

Others expect a lukewarm recovery in mining throughout the country as the year moves along. "Our business is the energy business," the executive continues. "If industry is down and temperatures are mild we just stare at the walls," he says.

"Last year was one of the poorest we ever had. This year is a mystery. If I was forced to predict, I'd say the first half of '83 will be just like the last half of '82. In other words, zero," says another industry source. The second half: "Some people in the business expect a real turnaround in coal, mainly because of a business recovery and a stalled nuclear program."

One new wrinkle for mining equipment makers is what nearly everyone outside of the oil industry is cheering about.

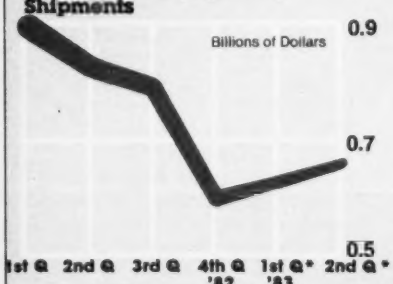
"Oil prices are in a free fall. To you that's great. To us it might mean the same thing as a mild winter," says one large coal mining equipment company vice president.

Just what the terrific drop in oil prices might mean to coal mining in the U.S. is a mystery indeed.

Meanwhile, other kinds of mining are doing little to keep spirits up in the equipment industry. "Iron ore? Worst year in living memory," says one expert in the business. This year? "Depends on steel. You tell me," he answers.

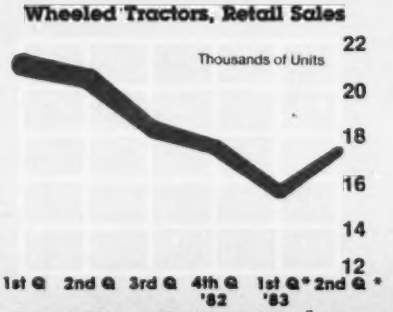
Copper mining? "About as hopeful as iron ore," says an expert.

Construction Equipment, Shipments



Source: Dept. of Commerce *IA Estimate

Wheeled Tractors, Retail Sales



Source: Farm and Industrial Equipment Institute *IA Estimate

Mining Equipment, Sales

Source: Mining Equipment Mfgrs. *IA Estimate

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QUARTERLY FORECAST

Material Handling

The material handling industry has been reporting very "good signals" from the marketplace for weeks. "We'd rather have orders," says one industry executive, "but the inquiries have been on the upswing for several weeks."

These "good signals" have been for large systems more than single items like industrial trucks, he adds. That means the larger companies are talking optimism seriously.

"We are very optimistic about '83, especially the first half," says an executive with one large material handling company.

"The marketplace seems to be convinced that what we make will be a good buy this year. We believe that '83 will show up as at least 25 pct better than '82 with most of that coming in the second half," he adds.

While the stacker/retrieval people are the most optimistic, even the manufacturers of more prosaic pieces of equipment are expressing some optimism. Says one lift truck maker: "What we make can be likened to a car. The buying cycle may have changed from three or four years to more, but that still means it's only a matter of time. We expect that time is fast coming up."

The consensus for first sales quarter? Not much above the last quarter of '82, perhaps up by 5 pct. The second quarter? Up perhaps by 8 pct over '82's second quarter. But, the last half of the year is where the hope lies. "For all of '83, we see an increase over '82 in this industry of 20 pct, but the last half will show almost all of the gains," says an analyst.

One further source of optimism for the warehouse systems is the lack, so far, of foreign competition in the domestic market. "You rarely import what they make," says the analyst. "It's just not practical, it's too custom."

Appliances

As housing sales increase, so does the optimism of the major appliance manufacturers. Sales of new single-family houses rose 9.9 pct in January over December figures, making the annual rate the highest in 28 months. In addition, existing-home sales were up significantly.

Along with the housing market, the appliance industry also has entered 1983 with a bang. January shipments of nearly 2.2 million major appliances surpassed January 1982 totals by 13.8 pct and December 1982 shipments by 15 pct. Making the strongest showing in recent weeks were refrigerators (up 31 pct in January), electric ranges, dishwashers, disposers and clothes washers.

"With gains in recent weeks, it looks like the appliance industry has definitely turned the corner in this recession," explains one industry spokesman.

Despite sales increases, spokesmen caution about being overly optimistic. Most suggest any industry growth that comes will be slow and steady. Recent figures look good only in comparison to some very poor months a year ago.

"Anything would look good next to last January, the worst one we ever had," comments one official.

Says one manufacturer, bad weather depressed sales last winter, making large sales increases this year suspect. However, he believes that the appliance industry is beginning its long-awaited recovery. Industry sources see appliance sales improving between 6 pct and 9 pct this year.

Although the industry expects the appliance replacement market to strengthen in 1983, it believes that increased home sales are the real key to recovery. The housing market began collapsing in 1979, hit bottom in 1981, and remained depressed through most of 1982.

Oil Country

Though other U.S. industries may show signs of a recovery in the second quarter, the oil country tubular goods (OCTG) industry will not be one of them. The outlook for OCTG producers and distributors is very pessimistic.

"I think the second quarter will be just as bad as the first one was," said a major pipe producer. "I see no reason to believe there will be any change. Most people are still selling out of inventory."

The producer further noted that he does not foresee any upturn in mill activity until the very end of the third quarter.

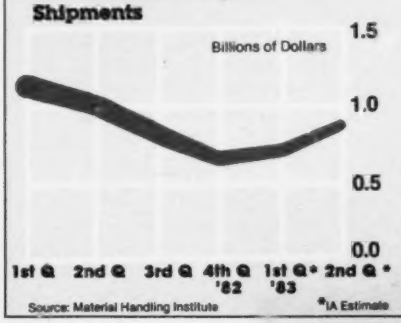
The outlook for OCTG distributors is equally as grim. "The market is deteriorating; it's not getting any better," said one pipe distributor. "The pressure on distributor prices is really bad; some are selling at 50 to 60 pct below list. People are really taking a bath. I see nothing encouraging for the second quarter," he noted.

Probably the biggest factor contributing to the depressed market is the surplus of OCTG inventory at nearly every level. It has been estimated that inventory on the ground ranges between 3.8 million and 4.3 million net tons, or about a 9½ months' supply. This combined with a U.S. rig utilization rate that was under 50 pct for the second week of March (the lowest since 1967) has reduced demand.

A major Houston-based oil company reports that it currently is doing "very little" buying of OCTG products. It noted that in the past few months it has sold millions of tons of its own OCTG inventory to "anybody" who would buy it, but it still has got "a whole lot left."

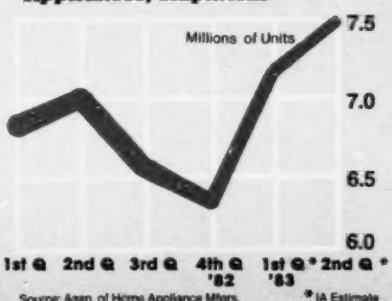
Also having a big impact on the industry has been the recent disarray among the Organization of Petroleum Exporting Countries over crude prices and production quotas.

Material Handling, Shipments



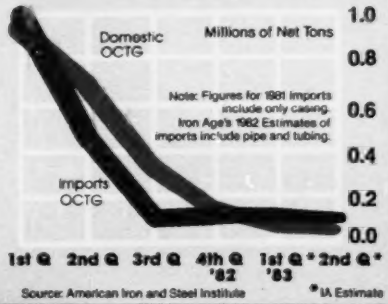
Source: Material Handling Institute *IA Estimate

Appliances, Shipments



Source: Assn. of Home Appliance Mfgrs. *IA Estimate

Tubular Goods, Shipments



Source: American Iron and Steel Institute *IA Estimate

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QUARTERLY FORECAST

Castings

The inching gains in foundry shipments are still being made.

Real movement, foundrymen believe, will not occur until the fourth quarter. Gray iron castings were showing a little better relative gain than ductile iron castings. Gray iron castings business dropped faster and deeper last year than ductile iron. As a result, gray iron, which is the bulk of ferrous castings business, is simply working its way back up to a more normal ratio with other types of castings.

Specialty irons also are performing a little better than ductile or the general run of iron castings. Compacted graphite iron castings are showing up well in the slight business upturn of the first quarter.

The gains are slight, but very broad. Even though some of the big castings markets, like mobile equipment, are still slow foundries are beginning to get a little more business from components makers who supply the truck and farm machine and construciton machinery plants. Diesel engines, also important to these heavy mobile equipment markets, have been showing a slightly better performance than sales forecasts for the mobile group would suggest.

There doesn't seem to be any particular geographic pattern to the gains.

Big foundries that sell across the central U.S., an important market for heavy castings, say they are getting about the same kind of recovery there that they get from their Sunbelt, or Eastern accounts.

The very mild gains, have been hitting non-ferrous castings about the same way. January began to move up. For a number of producers, apparently, February saw this stall for a while. But, as the month ended, the upward movement began again and has continued through the March period.

Forgings

In 1982 custom die forging orders fell 44 pct below 1981 figures. After such a gloomy year any ray of sunlight is welcome. Through the first half of 1983 that flickering beam of hope is being supplied by the automotive industry.

"Several companies have already reported increases in automotive orders," says one industry member.

Unfortunately, the percentage of forgings going into passenger cars is on the decline.

At present, only 6 pct of closed die forgings are used in cars. As a result, increases in auto sales impact forging firms only marginally.

Aerospace contractors purchase the biggest chunk (about 35 pct) of custom die forgings, but that industry has been sputtering. Orders for commercial aircraft continue to soften, although spending for military aircraft is holding up. Increases in military aircraft budgets are being felt in some forge shops. Increased military ship production also is resulting in new forging orders.

The other large markets for forgings, however, remain heavily depressed. They include farm equipment, off-highway, truck, and oil field products markets. Although housing starts are up dramatically, the strike at Caterpillar Tractor Co. and a large surplus of construction equipment is hindering growth of the off-highway equipment industry.

As the GNP improves, the forging industry should benefit. However, growth will be slow because too many industries served by forge shops could remain depressed through much of 1983.

In addition, the forging industry traditionally trails the leading edge of an economic recovery by six months, although some say that recovery this time around should be more rapid because right now forging inventories are very low.

Heat Treating

Manufacturers of industrial heating equipment and the commercial heat treaters are still in the economic doldrums of 1982. Neither group sees anything better on the horizon for 1983; only hope.

Domestic orders for industrial heat processing equipment for 1982 slipped by 35 pct from 1981. What's even more disturbing is that recent figures show a sharper rate of decline. The figures for the last quarter of 1982 were off from 1981 by almost 48 pct.

The signals from builders of industrial heating equipment are mixed. Many believe that orders will pick up sometime after mid-year. But some cling to their earlier predictions that the slide will continue into 1984.

Total orders for 1982 reached slightly over $300 million, significantly below what industry sources had predicted. The slowdown in orders is being attributed to just about everything that has impacted on the economy in general.

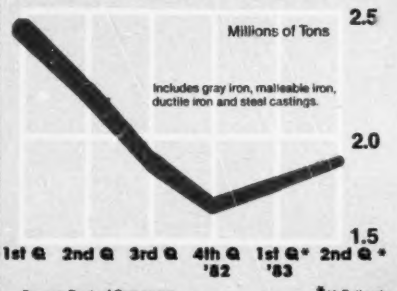
The commercial heat treaters, too, have taken their lumps. Final figures for 1982 showed a drop of more than 16 pct in billings from the prior year. But here again, slippage in the last quarter of 1982 was a whopping 32 pct.

Some slippage is expected to continue through 1983—perhaps on a smaller scale. One spokesman suggests 6 pct as a reasonable estimate.

Heat treating activity is picking up slightly in the depressed north-central states—but only slightly. The lack of activity in farm and off-the-road equipment could hold this area back for quite some time.

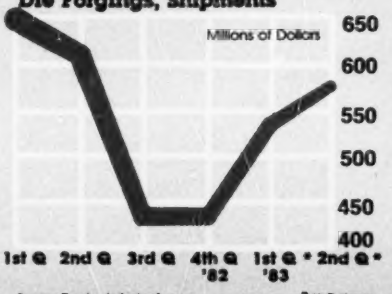
Energy-related activity in the Southwest also remains in the doldrums for the heat treaters. The West Coast is beginning to perk up with some billings coming from defense work and from high-technology industries.

Ferrous Castings, Shipments



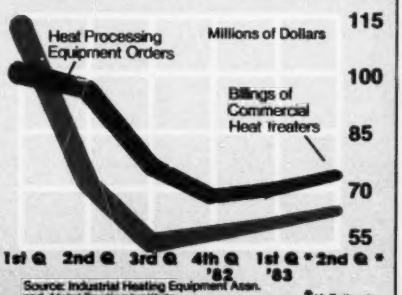
Source: Dept. of Commerce *IA Estimate

Closed Impression Die Forgings, Shipments



Source: Forging Industry Assn. *IA Estimate

Heat Treatment



Source: Industrial Heating Equipment Assn. and Metal Treating Institute *IA Estimate

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QUARTERLY FORECAST

Aircraft

The negative trend of the last several years seems likely to continue for most of 1983 for commercial aviation, with all major airframe manufacturers reporting depressed demand for new aircraft. T. A. Wilson, board chairman of Boeing Commercial Aircraft, echoes the common sentiment when he says commercial orders will continue at reduced levels until a general worldwide economic recovery begins and airline traffic growth and profitability start to reflect this turnaround.

Economic analysts at Boeing project the trickle-down effects of such a recovery are at least one year away from impacting the manufacturers. Officials at the Douglas Aircraft Div., of McDonnell Douglas, peg the time lag at about nine months. If that is indeed the case, 1983 promises to be a slow period for the industry. Already, orders during the first quarter are lagging substantially behind one year ago (when total new orders wound up being less than half of 1981's figure). The momentum created by a spurt of sales and novel leasing arrangements in the fourth quarter of 1982 has failed to carry over into the new year.

The manufacturers have good reason to be bearish. Used aircraft continue to clutter the market, several major U.S. carriers remain on shaky financial ground and recent airline forecasts are pessimistic. Despite lower oil prices, the International Air Transportation Association expects record losses in 1983.

"The oil companies do not necessarily pass price cuts on to us," says David Kyd, a spokesman for the group. "Nothing on the cost side could equate what we could get from an economic upturn."

Losses for airlines in 1983 could total $2.3 billion, above last year's $2 billion loss. Demand for seats is expected to rise by 2 pct this year, but excess capacity should rise by 3 pct.

Engines & Turbines

Shipments of engines and turbines are expected to continue their downward slide in the second quarter, but certain segments of the wide-ranging category will see some improvement.

The utilities market slump is expected to last well into the decade. As one industry analyst points out, "It took a long time to shut them down. With all that extra capacity to soak up, there will be a substantial lag in recovery." He adds there are no new nuclear projects, domestic or international, and prospects are dim "for the equipment suppliers to the electric utilities industry."

With crude oil pricing so low, new refinery business is at a virtual standstill. "But there's still business from revamps," according to one executive. He adds that, in general, he's not expecting any notable increase in capital expenditures by his customers. "They can satisfy their markets with the equipment they have. . . . We expect 1983 to be about the same as 1982," he estimates.

Cogeneration is beginning to catch on. Manufacturers of turbine generator sets are concerned it will erode their market.

The diesel engine end of the industry is beginning to come alive again. An analyst for a major manufacturer says, "Overall, the industry is tracking a recovery. There are some questions and changes, but the order board has been firming since January."

Orders for diesel engines by truck makers normally are tied to increases in tonnage moving; this time, there does not appear to be a rapid increase in tonnage moving, but retail sales have firmed more quickly than other economic indicators. The analyst forecasts that the market is beginning to exhaust excess capacity and that the trend seems to be toward ordering new trucks rather than ordering parts for repair.

Welding

It seems incredible that the welding industry is still reeling from such a tremendous setback in 1982 after having coming off the best year in its history—1981.

From all appearances, however, the worst is over, and there are some signs of improvement here and there. Examples are automobiles and construction industries, both heavy users of welding.

According to statistics compiled by the National Welding Supply Association, Philadelphia, the fourth quarter of 1982 was the worst since the first quarter of 1979.

Things weren't much better in the first quarter of this year, but there has been an improvement. Look for a more pronounced improvement during the next quarter.

"January was the first month in which our business improved since last summer," says one welding distributor from the West.

"Our outside sales received more positive support; and we noticed a little upward movement in the construction area."

A Midwestern distributor has this to say: "Certain of our customers are busier than others, but most are still plugging along at lesser volume levels. There seems to be a lull in business activity as everyone waits for a major turnaround."

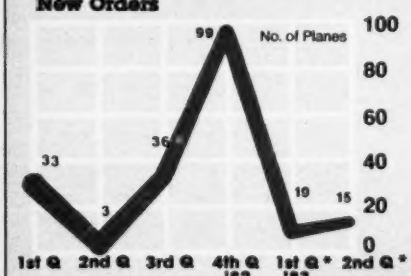
"We're seeing gradual upturn now," another distributor remarks, "and if interest rates continue to drop we should see a more accelerated comeback by April or May."

Although a small slice of the welding market, robotics is poised for a big jump in sales.

This will help in the sale of solid Mig wire and equipment.

But the one industry that will help welding a great deal—defense—has not yet come through with the contracts.

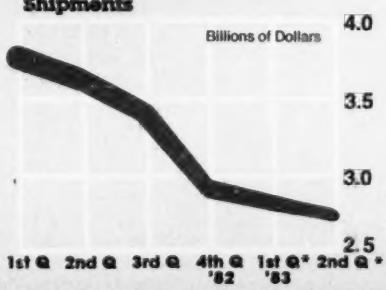
Commercial Aircraft, New Orders



Source: Aerospace Industries Assn., Airbus, Boeing and McDonnell Douglas

*IA Estimate

Engines and Turbines, Shipments



Source: Dept. of Commerce

* IA Estimate

Welding, Shipments

Source: National Welding Supply Assn.

* IA Estimate

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QUARTERLY FORECAST

Fasteners

"There's increased buying, sure, but not from us," says one standard fasteners maker in Ohio. "I expect you'll see quite a few closings in the next few months due to the Commerce Dept's thumbs down," he adds.

The "thumbs down" was the negative conclusion of a U.S. Dept. of Commerce study requested by the Secretary of Defense. The study considered claims that the domestic standards industry could not react adequately (should mobilization be required for some military emergency) if imports continue unchecked.

"Commerce said we can safely and comfortably rely upon an 8,000 mile pipeline to Japan. So we can also safely watch the domestic standards industry disappear," says an industry observer.

Meanwhile, the industry is continuing to experience the worst sales period in decades. "Last year, particularly the last few months of it, was an unmitigated disaster. I don't see '83 as any better for the standards industry. In fact, it will probably be far worse. We just cannot compete with what's coming in from Asia. No way," says an industry source.

"There will be no standard mechanical fastener industry in this country in a few years," predicts one expert.

Other kinds of mechanical fastener companies, those that make so-called "specials" or engineered fasteners are not nearly so pessimistic. Says one company vice president, "If 1983 is nearly as bad as '82, we'll be surprised. I'd say we'll be up by at least 20 pct over '82 when the final figures are in."

Says another "the standards market is not even a nickle and dime business. We got out years ago. What we're left with is a pretty good value-added bet." He does not feel, as some others do, that it's only a matter of time before the foreigners wipe that part of the industry out, too.

Screw Machine Products

Screw machine products manufacturers are beginning the second quarter of 1983 with slightly higher sales and more optimism than the dismal last months of 1982.

"The improvement is only very small but it is something we have not seen in a long time," comments one source.

At this point both new orders and optimism are particularly fragile commodities. "We have no way of knowing whether the upturn is going to continue or whether it is simply a small spurt of new orders," says an industry spokesman. "Maybe when we get inventories where they belong, business will be right back down again."

Despite its delicate condition, small growth should continue through the second quarter as the general economy picks up slightly and the screw machine products industry follows along. Significant increases in sales in the housing and appliance industry as well as a pick up in automotive sales should help the industry recovery.

About one-third of all screw machine products are targeted for the automobile market, so car sales increases in the last quarter of 1982 and the first quarter of 1983 have been good news. New car sales for 1983, although up from last year, are still far from spectacular. In early March, for example, domestic sales of U.S.-made cars increased only 2.7 pct compared to a similar period in 1982, although analysts are predicting that sales will gather strength at the end of the second quarter and through the third and fourth quarters.

Increasing home sales and housing starts mean that more screw machine products are finding their way into appliances, plumbing equipment, and electrical supplies.

Increases in military spending are beginning to be felt.

Stampings

Stampers say business looks better in the first half of 1983 than it has in more than a year.

Preliminary first quarter results indicate a definite uptick from a dreary second half of 1982.

The reason for the higher hopes? Primarily, increased demand from the automotive and housing-related sectors.

Stampers are beginning to receive some new orders from their customers who supply the automotive and appliance industries.

A major Midwestern stamper, who complained last year about so many "immediate delivery" requests, says, "They're not as bad on short-notice orders. Before they were buying only small quantities, just what they needed."

There's a lot more quoting activity, but it's taking longer for customers to get the quotations; apparently stampers have cut personnel so sharply that even the mild pickup is taxing the pared-down staffs.

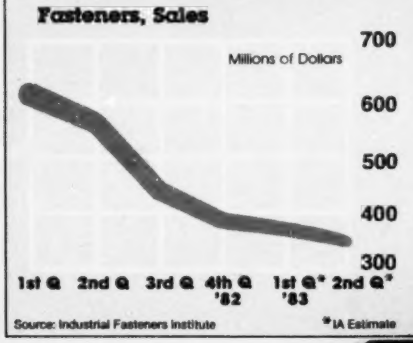
Many stampers are reporting better schedules and even call-backs of some laid-off workers. Most feel that the economy is headed in the right direction.

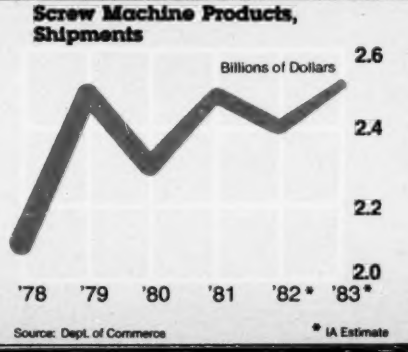
Farm implements are still way down, though. With crop prices so low, farmers are being cautious; plus, there's still plenty of inventory sitting in distributors' yards.

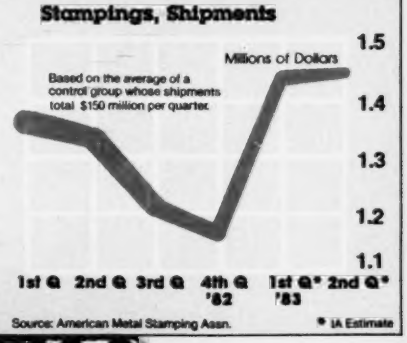
The Caterpillar strike has hurt stampers who supply that industry giant.

Cummins, however, is "enjoying the Cat hiatus," according to one stamper. "They're making more engines, and ordering more and farther out," he says.

Some words of caution from one executive: "Everyone's seen more activity in January and February, but don't expect business to jump from disaster to boom overnight."







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QUARTERLY FORECAST

Bearings

The antifriction bearing industry, which saw sales drop off about 15 pct in 1982, should recoup slightly in the first half of 1983. For the full year, recovery could reach a modest 5 to 8 pct.

At the start of 1983's second quarter, however, bearing manufacturers have yet to feel much pickup in orders, especially from OEM manufacturers. Some increases in aftermarket sales have been observed.

OEM sales are slow because most factories heavily serviced by bearing manufacturers remain deeply mired in the recession. These depressed industries manufacture general industrial machinery, farm equipment, construction machinery, railroad supplies, machine tools, oil field goods, and aircraft.

"Most industries which buy large quantities of bearings have yet to turn the corner of this recession," reports one industry source. "But while industrial production remains low, consumer goods production is showing a few bright spots."

The brightest spot is the automobile industry which accounts for approximately 30 pct of all bearing sales. Automobile sales have picked up slightly in the last quarter of 1982 and through the first quarter of 1983. Indications are that during the next few months, these tentative gains will strengthen. For the year automotive production increases may reach 30 pct although 10 to 15 pct are probably more realistic figures.

The auto industry may carry the bearing industry on its back from a depressed year to one of minimal growth.

As companies dig themselves out of this recession, they will put off buying new machinery and equipment for a while.

However, with production increasing, old equipment is shouldering the increasing burden.

Valves

The valve industry is still trying to recover from blows to industrial and municipal markets in late 1981 and the oil patch in early 1982; it doesn't appear the patient will be on its feet again by the second quarter, though the prognosis has improved.

Valve manufacturers are reporting that quotation activity is up—particularly in the AWWA municipal and nuclear ends—but that even improved order books in the spring won't result in a "significant upturn that affects shop loading until the third or fourth quarter," estimates one Northeastern executive. "Right now, the first really good bookings forecast month is May," he adds.

Another executive, in the steam end of the business, says all the industrial markets are down and probably will continue flat, at least through the third quarter.

"Except for the oil industry, all are going to be slow coming out of this recession," he predicts.

Valve makers tied in with the energy markets—oil, gas and electric power—generally expect business will hit bottom in the first part of 1983, lagging the rest of the industry, which saw rock bottom at the end of last year. While one executive says his company has "no nuclear business to speak of," another says that older projects are "perking along" and even speeded up, with new projects on the horizon.

Two complaints being voiced by a number of executives: Many companies are underbidding on small projects just to fill their shops, making it impossible to make any money on the little bit of work that's around.

Second, many are buying castings offshore, forcing the domestic industry to shrink further. There's concern that when business comes back, the domestic capacity won't be there and prices will shoot up.

Gears

"Nothing will happen in '83. We wish we could all die and wake up in the middle of 1984," laments a gear industry source.

And that's about the most optimistic prediction anyone in the industry has for the second quarter, and the rest of the year.

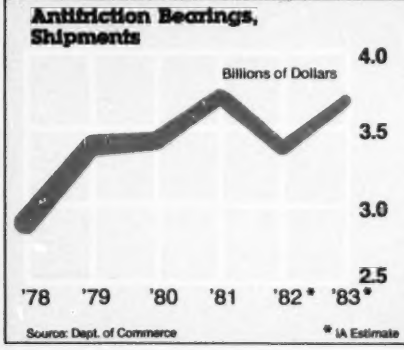
Some gear makers may find business down as much as 50 pct over second quarter 1982. One problem is the industry's tendency to lag the economy by six to nine months. "And I don't see that we've turned the corner, despite what the Administration says," adds the industry source. "Interest rates are still too high."

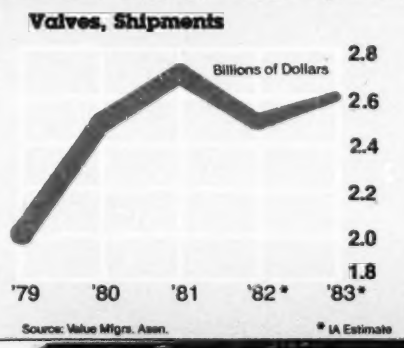
Which brings us to the subject of the huge budget deficit. Gear makers say customers are nervous that interest rates will shoot up again as soon as the government comes into the money markets to borrow. Imports continue to be a problem, especially in such high-priced items as speed reducers. Manufacturers' inventories are cut to the bone.

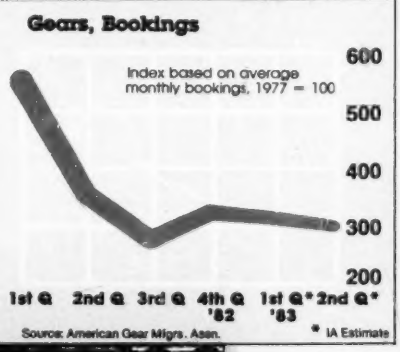
It may be of little consolation, but gear makers who supply a variety of industries say the dropoff in business has been about even across the board. Steel and commercial construction are still way down. Floating mortgages are discouraging builders. Idle capacity means business from steel producers is still sometime off. Some manufacturers are finding solace in steady business from the paper and defense aerospace industries. Also, updating, parts and repairs are keeping others afloat as they ride out the recession's storm.

A leading Midwestern gear maker predicts that in spite of economic improvement, "utilization of current equipment is so low that we won't see much purchasing of capital goods for a long time."

Certainly not in time to save second quarter '83.







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QUARTERLY FORECAST

Shipbuilding

The U.S. merchant shipbuilding industry is dead in the water—virtually nonexistent. The program to expand and modernize the U.S. Navy is moving along at a fair pace—while defense budget cuts are debated on Capitol Hill.

Those shipyards able to build, reconvert or repair Navy ships have little to worry about. They are getting work and will continue to receive more as the naval shipbuilding program gets up to full speed in the mid-1980s.

For shipyards that must rely on merchant ship construction, the offshore oil rigs, tugs and barges, and general repair work, the outlook is extremely bleak.

There is a good prospect some shipyards could disappear or be absorbed into other companies in the next two years.

Here's how a spokesman for the Shipbuilders Council sums up the current situation in merchant construction: "Contracts for only *three* merchant ships of 1,000 gross tons and over were placed with our industry during all of 1982. None of these were cargo vessels. Drill rig orders totaled two. At the end of last year, the industry's order book consisted of 22 merchant vessels and 25 drill rigs, all with completions scheduled for the present year."

An official at the U.S. Maritime Administration takes a similar view: "Only 18 deep-draft commercial vessels were projected to be under construction or on order as of the beginning of this year.

"That's 17 fewer than a year earlier, representing a 414,000-ton decline in gross tonnage.

"There is the lowest number of deep-draft commercial ships on order in U.S. shipyards since 1956 and the lowest gross tonnage outlook since 1966. All but four of these 18 ships are scheduled for delivery by the end of 1983."

And market researchers at a large steel company make this assessment: "In 1982 there were only three merchant contracts awarded domestically.

"All three came in April and that was the year's final tally. Private total U.S. shipyard employment has reached a ten-year low. Growth in naval shipbuilding will be the only plus in this market in 1983."

At the start of his term, President Ronald Reagan announced two maritime aims—enlarging the Navy and restoring commercial shipbuilding to a decent position in the world market.

The shipbuilders have been dismayed by the Administration's backing away from the second half of this commitment.

The spokesman for the builders told a Congressional committee, "By decision and indecision, by word and action, the Administration has evidenced a disposition to relegate commercial shipbuilding in the U.S. to extinction."

Rail Cars

The recession was just the final blow for rail car builders.

The industry's troubles actually began, although it was not apparent, in 1978 and 1979. Then orders for new cars were at high levels. In 1978 new orders totaled 130,000 cars. The following year they were 119,000 cars.

From there the path was downward—in 1980 to 46,000, only 18,000 in 1981, and last year just a little over 7,600.

"Frankly, there was overbuilding in the late '70s," says an industry spokesman. But that was not the full cause of the present dismal state of the industry.

Railroad mergers brought combinations that led to duplications of car stock.

Deregulation of the railroads allowed them to operate at greater efficiency with more existing cars placed in the idle stockpile.

And finally came the Great Recession, reducing the amount of goods hauled and further curtailing the need for cars.

Now, even if the railroads share in the improving economy, they won't need to order many more cars. Too many existing ones are mothballed. The majority of orders coming into builders now are for cars designed for specific, specialized hauling.

As the chart indicates, new orders will be rare commodities this year. In January 1982, the builders received orders for 835 new cars. This past January the total was only 501. And indications are that February's total could be half that.

A government analysis of the rail car outlook for this year cites "continued low levels of demand and shipments. Production is forecast at 25,000 cars, about the same level as 1982. New orders will not begin to increase substantially until the demand for rail services increases and then only after the present surplus of inactive cars is absorbed."

The builders themselves hope to see an upturn in orders starting in the last quarter of this year and continuing into 1984. But they've got their fingers crossed.

An analysis by the market researchers for a steel company notes, "With rail car builders' backlogs virtually nil, even if freight car orders double this year, shipments will remain substantially below last year."

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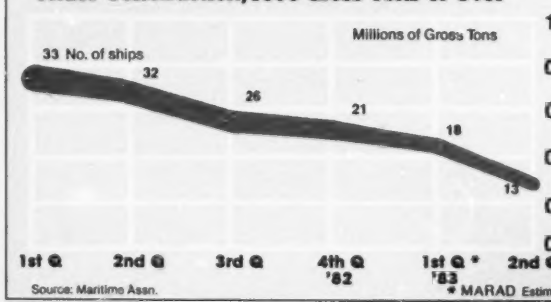
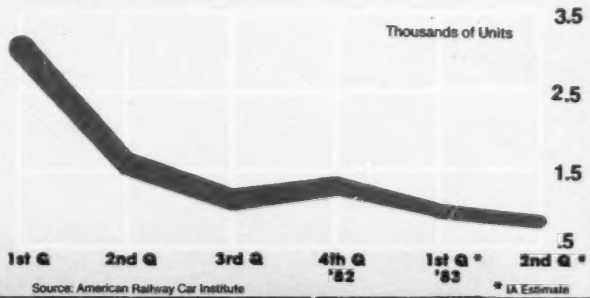
Shipbuilding, Commercial Ships on Order or Under Construction, 1000 Gross Tons or Over



Source: Maritime Assn. * MARAD Estimate

Rail Car, Orders



Source: American Railway Car Institute * IA Estimate

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DIRECT REDUCTION IS A SURVIVOR

New reduction projects lagged in 1982, but there is considerable fresh activity on the horizon now.

BY GEORGE J. MCMANUS

Direct reduction has come through the steel slump in better shape than might have been expected.

Last year saw a continued buildup of direct reduction (DR) experience and capacity. New processes gave promise of closing the loop between direct reduction and coal.

There was work on integrating solid state reduction with the smelting of molten iron.

New reduction projects lagged last year, but considerable fresh activity is now on the horizon.

Coming up are reduction plants in Iran, Egypt, and probably the Philippines.

In the U.S., direct reduction could come through the back door. The Klockner-Scrap (KS) process, which could provide a good reducing gas as well as taking a lot of scrap off the market, was given serious consideration at one large mill.

All this is looking on the sunny side of a picture that has its gloomy aspects.

Direct reduction frequently suffers in a recession because of the general cuts in steel spending.

The reduction process gets an extra jolt because scrap prices come down in a slump.

In 1982, the worst recession since the 1930s made the negative effects on scrap and spending particularly severe. To make matters still worse, the price of natural gas, which is the ideal reducing agent, continued its rapid rise in industrial countries.

As a result, direct reduction received some painful setbacks. Shutdown last year were the only two mill-based reduction plants in the U. S.—at Armco Inc. in Houston and at Georgetown Steel Corp. in South Carolina.

In the case of Armco, a long-term natural gas contract at Houston expired last year.

Armco faced the prospect of paying something like 15 times more for a new gas supply. The company decided to close its gas-based reduction plant.

The shutdown underlined one of the basic problems of direct reduction. "The best processes are natural gas processes," says T. E. Dancy, technology vice president for Sidbec-Dosco, Ltd. The two most widely used of these processes are Midrex and HYL.

Sidbec-Dosco installed two Midrex units.

"When we justified these plants, we had favorable economics," says Mr. Dancy. Because of government policies, he says, natural gas prices have zoomed despite abundant supplies of the fuel.

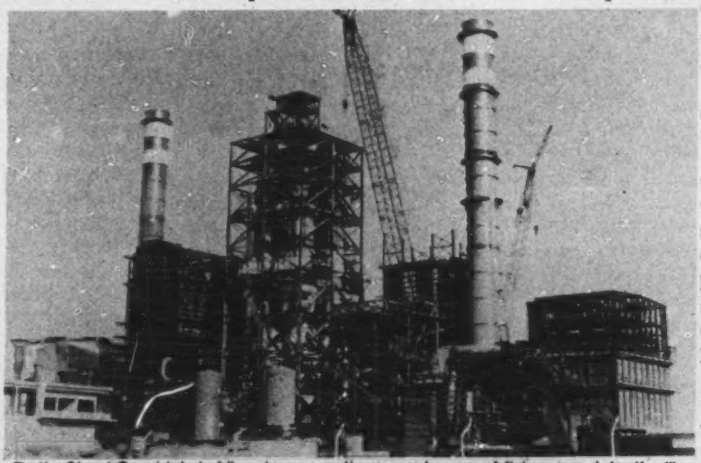
With scrap prices falling, the economics have changed.

"We no longer have a competitive situation," says Mr. Dancy. Accordingly, Sidbec-Dosco has sidelined one of its reduction plants.

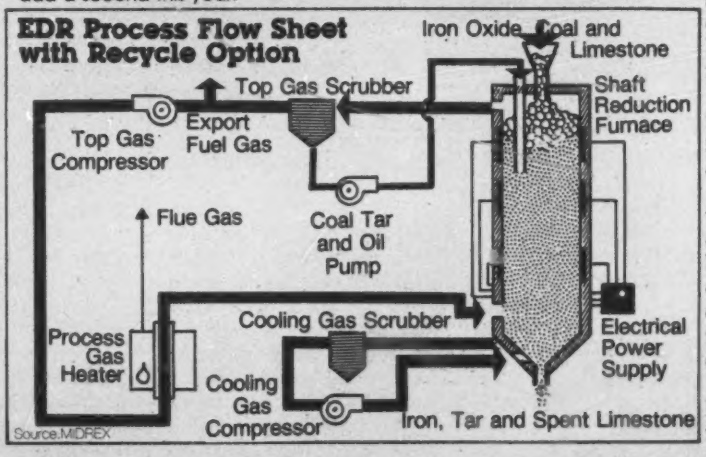
"DRI (direct reduced iron) is now only used for controlling residuals."

There are places where natural gas is still cheap and there are coal based reduction processes. In 1982, however, no one was looking for more iron and steel capacity.

"There were no new DR installations contracted in 1982," says J.



Delta Steel Co., Ltd., in Nigeria currently operates one Midrex module. It will add a second this year.



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E. Bonestell, vice president, Midrex Corp. This was the first time direct reduction was shut out in many years, adds Mr. Bonestell.

For steel and direct reduction, the tide may now be turning. "You've already seen a jump in the price of scrap," says Mr. Bonestell.

Direct reduction people are hoping for a further jump. "What you run into is the cost of scrap versus DRI," says G. E. McCombs of Dravo Engineers and Contractors. "We're still optimistic about the DRI market." Dravo builds plants of the HYL and Krupp-CODIR types.

While new contracts lagged last year, a number of projects started earlier were completed. The second Midrex unit at ISCOTT in Trinidad came on stream. One Midrex module at Delta Steel Co., Ltd., in Nigeria began operating in 1982. When the second unit starts in 1983, Delta will have more than 1 million tons of reducing capacity.

In Saudi Arabia, one Midrex unit came on stream last year and the second will start in 1983. A 650,000-ton Midrex plant in Malaysia is scheduled for startup in 1984.

The second HYL III plant of Hylsa began operating at Monterrey, Mexico, in 1982. Two HYL plants in Indonesia were scheduled for 1982 startup. Coming up is the 2-million-ton HYL complex at Sicartsa in Las Truchas, Mexico.

A 150,000-ton plant employing the ACCAR process of Allis-Chalmers began operating at Orissa, India, in January. ACCAR uses a rotary kiln for reduction and is flexible from a fuel standpoint. The Orissa plant is operating with 80 pct coal and 20 pct oil.

These and other installations are providing a significant supply of reduced iron. According to the Industrial Economics Research Institute of Fordham University, world reduction capacity was more than 17 million tons in 1980 and will reach nearly 40 million tons by 1987.

Current capacity is enough to make reduced iron readily available on the open market at reduced prices. In the 1982 recession, prices being quoted in the U.S. were down to a range of from $90 to $100 a ton. This range was a reflection of market conditions, not costs.

The FIOR plant in Venezuela is exporting all its output. After a long debugging period, the FIOR unit is now producing 1,100 tons a day. FIOR iron is in the form of briquettes, which have the advantage of traveling well. The new Malaysian Midrex plant, which will be strictly an export merchant op-

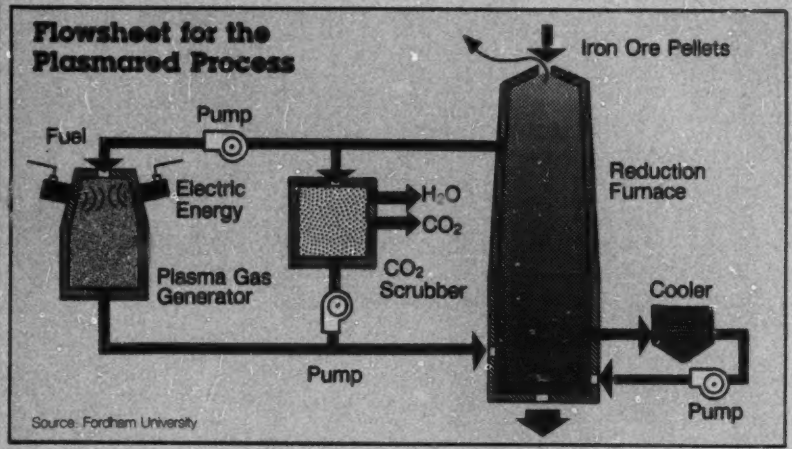
(Cont. on p. MP-8)

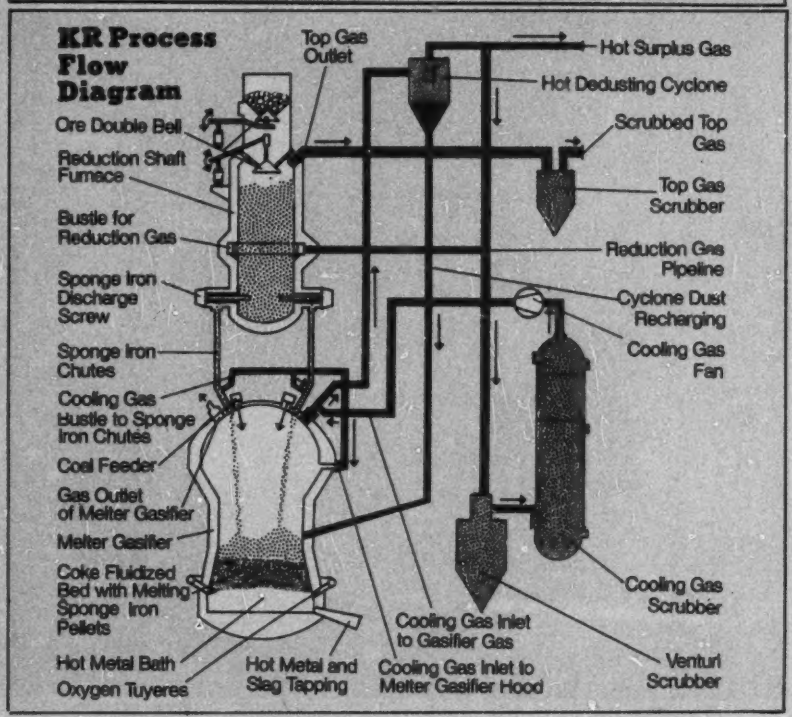
World Capacity to Produce Steelmaking-Grade DRI

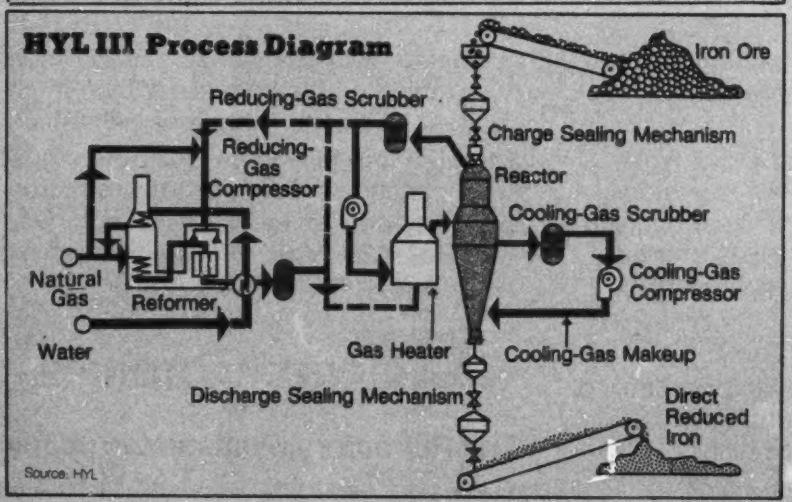
Capacities Through 1980 and Projected Through 1987

BLAST FURNACE TABLE	Date of Startup	Process	Reducing Agent	Annual Capacity 000 tons
North America				
Canada—Niagara Metals, Niagara Falls	1973[1]	ACCAR	C/O/G	40
Canada—Sidbec-Dosco, Contrecoeur	1973	Midrex	G	440
Canada—Stelco, Bruce Lake	1975[2]	SLRN	C	385
Canada—Sudbury Metals, Falconbridge	1976[2]	ACCAR	O/G	265
Canada—Sidbec-Dosco, Contrecoeur	1977	Midrex	G	660
U.S.A.—Oregon Steel, Portland, Oregon	1969[2]	Midrex	G	330
U.S.A.—Georgetown Steel, Georgetown, S.C.	1971	Midrex	G	440
U.S.A.—Armco Steel, Houston, Texas	1972	Armco	G	365
U.S.A.—DR Corp., Rockwood, Tennessee	1976[1]	DRC	C	65
Latin America				
Argentina—Dalmine Siderca, Campana	1976	Midrex	G	365
Argentina—Villa Constitucion, Acindar	1978	Midrex	G	465
Brazil—Acos Finos Piratini, Charquedas	1973	SLRN	C	70
Brazil—Usiba, Bahia	1974	HYL	G	255
Brazil—Cosigua, Santa Cruz	1977[3]	Purofer	O	—
Mexico—Hylsa, Monterrey	1957[1]	HYL	G	105
Mexico—Hylsa, Monterrey	1960[4]	HYL III	G	285
Mexico—Tamsa, Vera Cruz	1967	HYL	G	275
Mexico—Hylsa, Puebla	1969	HYL	G	350
Mexico—Hylsa, Monterrey	1974[3]	HYL	G	530
Mexico—Hylsa, Puebla	1977	HYL	G	770
Peru—Siderperu, Chimbote	1979	SLRN	C	110
Trinidad & Tobago—ISCOTT, Point Lisas	1980	Midrex	G	465
Venezuela—Fior de Venezuela, Matanzas	1976	FIOR	G	440
Venezuela—Sidor, Matanzas	1977	Midrex	G	390
Venezuela—Sidor, Matanzas	1977	HYL	G	465
Venezuela—Sidor, Matanzas	1979	Midrex	G	1405
Venezuela—Sidor, Matanzas	1980	HYL	G	2315
Europe/Asia				
West Germany—Thyssen, Oberhausen	1970[1]	Purofer	G	165
West Germany—Hamburger Stahl, Hamburg	1971	Midrex	G	440
Italy—Kinglor-Metor, Buttrio	1973[1]	K-M	C	10
Italy—Ferriere Arvedi, Cremona	1976[2]	K-M	C	45
India—Sponge Iron India, Paloncha, A.P.	1980[1]	SLRN	C	35
Indonesia—Krakatau Steel, Kota Baja	1978	HYL	G	635
Indonesia—Krakatau Steel, Kota Baja	1980	HYL	G	1900
Japan—Nippon Steel, Hirohata	1976[1,2]	NSC	K	165
Middle East/Africa				
Iran—NISIC, Ahwaz	1978[3]	Purofer	G	365
Iraq—Government, Khor Al-Zubair	1979	HYL	G	550
Qatar—QASCO, Umm Said	1978	Midrex	G	440
South Africa—Dunswart Steel, Benoni	1973	Codir	C	165
Oceania				
New Zealand—New Zealand Steel, Glenbrook	1969	SLRN	C	165
Total World Capacity (Year-end 1980)				**17130**
Projected Capacity[6]				
West Germany—Norddeutsche Ferro., Emden	1981	Midrex	G	970
India—Orissa Sponge Iron, Keonjhar, Orissa	1981	ACCAR	C/O	165
Nigeria—Delta Steel, Warri	1981	Midrex	G	1215
Trinidad & Tobago—ISCOTT, Point Lisas	1982	Midrex	G	465
U.S.S.R.—DEMK, Kursk	1982	Midrex	G	1840
Iraq—Government, Khor Al-Zubair	1982	HYL	G	1100
Mexico—Sidermex, Sicartsa	1983	HYL III	G	2205
Mexico—Hylsa, Monterrey	1983	HYL III	G	825
Saudi Arabia—HADEED, Al Jubail	1983	Midrex	G	880
South Africa—Scaw Metals, Germiston	1983	DRC	C	85
Burma—Government	1983	K-M	C	20
Argentina—Sidersur, Rio Negro	1984	HYL III	G	550
Mexico—Premexsa, Tampico	1984	HYL III	G	1100
Libya—Government, Misurata	1984	Midrex	G	1215
Malaysa—Sabah Project, Labuan	1984	Midrex	G	715
United Kingdom—British Steel, Hunterston	1985[7]	Midrex	G	880
Iran—NISIC, Ahwaz	1985[7]	Midrex	G	1325
Iran—NISIC, Ahwaz	1985[7]	HYL	G	1100
Spain—Presursa, Huelva	1985	Midrex	G	855
Ecuador—Ecuasider, Machala	1986	Midrex	G	440
India—Government, Bihar	1986[7]	SLRN	C	130
Peru—Siderperu, Chimbote	1986[7]	Codir	C	220
U.S.S.R.—DEMK, Kursk	1987	Midrex	G	3750
Total Projected Capacity (as of 6/31/81)				**22050**
Total Projected World Capacity (year-end 1987)				**39180**

Reducing Agents—Coal (C), Oil (O), Natural Gas (G), Kerosene (K). [1]Operates either totally or in part as a pilot or demonstration plant. [2]Plant is currently shut down. [3]Plant is being dismantled. [4]Conventional HYL unit was converted to HYL III, with startup in 1979. [5]Conventional HYL unit being converted to HYL III, with scheduled startup in 1981. [6]Plants under construction, contract, or agreement. [7]Project is currently delayed. Source: Fordham University.







(Cont. from p. MP-5)

eration, will be equipped for hot briquetting.

In 1983, a number of completely new projects will move forward. Coming up in the second quarter is a 3.2-million-ton direct reduction complex in Iran. The steel phase of this project, which was interrupted by Iran's political upheaval, is already in the construction stage.

The Midrex process is being offered in Iran by a consortium that includes Korf Engineering and Voest-Alpine. Kawasaki Steel Corp. is bidding with HYL technology.

Also expected in the second quarter is a contract for a 750,000-ton direct reduction plant at Alexandria National Steel in Egypt. Nippon Kokan, which has invested in the complex, has already been awarded the contract for the steel shop. Bidding with Midrex technology are Lurgi and Kobe Steel, which is another investor in the Alexandria project.

Kawasaki Steel Corp. is offering the HYL process for Alexandria Steel. Financial support is coming from the World Bank and the International Monetary Fund.

In the Philippines, a 1.4-million-ton steel plant is reportedly ready to go. The project will include a rotary kiln reduction plant of Kawasaki design.

In Sweden, the government had reportedly provided backing for a Plasmared plant to reduce iron ore pellets. Developed by SKF Steel, Plasmared employs a shaft furnace for reduction and a plasma arc torch for generating and heating the reducing gas in a separate vessel.

A 70,000-ton Plasmared system has been operating at Hofors in Sweden since January 1981. This originally used natural gas, but more recent tests have shown the feasibility of having coal as the gas source.

The new Plasmared plant is scheduled to be tied in with the LKAB ore pelletizing operation. These pellets are low in silica and have been widely used in direct reduction operations.

Others are looking at the feasibility of tying direct reduction to iron ore operations.

"I think there will be a lot of activity in Canada," says D. R. MacRae, research supervisor for process development at Bethlehem Steel Corp. Like LKAB in Sweden, explains Mr. MacRae, the Canadian iron ore companies are anxious to upgrade their product.

The various reduction processes are being carried out on the basis of world energy sources, he adds. "You can divide the industrialized countries up into those where there is cheap electric-

ity and all others. The so-called plasma processes, which use electricity, will be favorable for Sweden, Norway, Canada and perhaps in Brazil."

Where natural gas is available at low cost, says Mr. MacRae, direct reduction is already an established process. Material from gas-based merchant plants, such as the ones in Malaysia, will be flowing into the world market.

"In this country," says MacRae, "I don't see it going ahead based on natural gas. All the plants that use gas are closing down. They'll have to be based on coal."

Mr. MacRae doubts that electric smelting of iron will find widespread use in the U.S. He does see a place for the new coal-based technology, such as Korf KR, which produces molten iron.

"Right now we have excess capacity in blast furnace hot metal. It will be considered very strongly at the time—for example, at Burns Harbor—when we would need some additional hot metal capacity."

In line with Mr. MacRae's thoughts on electric power, the engineering is 95 pct complete on a 400,000-ton Canadian plant of the INRED type. Developed by Boliden AB of Sweden, INRED prereduces iron ore in a flash smelting step. Final reduction and melting take place in the electric furnace portion of the single reactor.

A 60,000-ton INRED demonstration plant is operating at LuLea in Sweden. The 400,000-ton plant for Canada is covered by a letter of intent from IVACO Inc.

The process has drawn an "excellent response" from American steel companies, says R. A. Westman, president of Inred Iron, Inc. Domestic companies are interested in reducing mill oxides, says Mr. Westman.

The direct use of coal for solid state reduction of iron ore has never been an unqualified success. Most of the processes employ rotary kilns. There have been various problems, the greatest of which has probably been competition from low priced scrap.

Eleven SL/RN plants have been built. The two biggest of these—at Stelco in Canada and at Nippon Koka in Japan—are not operated on a regular basis. However, new SL/RN plants are scheduled for 1984 startups at ISCOR in South Africa and at New Zealand Steel.

Scheduled for start-up this year is the reduction plant of SCAW Metals Ltd. of South Africa. This will use the rotary kiln process of Direct Reduction Corp. A pilot plant has been operated by Direct Reduction in Rockwood, Tenn. The SCAW plant will be engineered and built by Davy McKee Ltd.

A completely different approach to coal-based reduction is the process of International Metals Reclamation Co., Inc. (INMETCO). A subsidiary of INCO, INMETCO reduces oxides on a rotary hearth furnace. The reducing action is provided by mixing crushed coal with the oxides and then applying heat.

INMETCO is now operating an 80,000 ton plant at Ellwood City, Pa. This is used to reclaim electric furnace dust and other oxides from stainless steel plants around Pittsburgh. For this particular application, nickel and iron oxides are fully reduced in the solid state, but a melting step is required for the final reduction of chromium oxides.

No melting step is needed for carbon steel oxides or iron ore, says Todd Grant, president of INMETCO. "We know the process does work on carbon steel wastes and ores," says Mr. Grant.

Because the carbon and oxides are in intimate contact, he says, the operation is very efficient. "We get a very fast reduction—in less than an hour, one trip around the furnace. In most of the kilns, it takes anywhere from 4 to 12 hours to run through the kiln."

The close contact of materials makes for low fuel consumption, says Mr. Grant. Energy use of 10 million Btus a ton is in line with the gas-based processes, he states. "Most of the coal-based processes are running anywhere from 16 million to 20 million Btus," he adds.

A third advantage cited for the INMETCO process is gentle handling. The pellets are deposited very softly. "We could lay eggs down on the hearth," says Mr. Grant. For this reason, it is not necessary to harden the pellets.

INMETCO is not interested in going into the direct reduction business. The company is offering its process to equipment builders and to users on a license basis.

A difficulty with many coal-based processes is the transfer of sulfur from the coal to the iron. The Lummus/Sumitomo RIOR process is designed to operate with a high sulfur fuel—petroleum coke—and to produce metallized pellets with less than 0.03 pct sulfur.

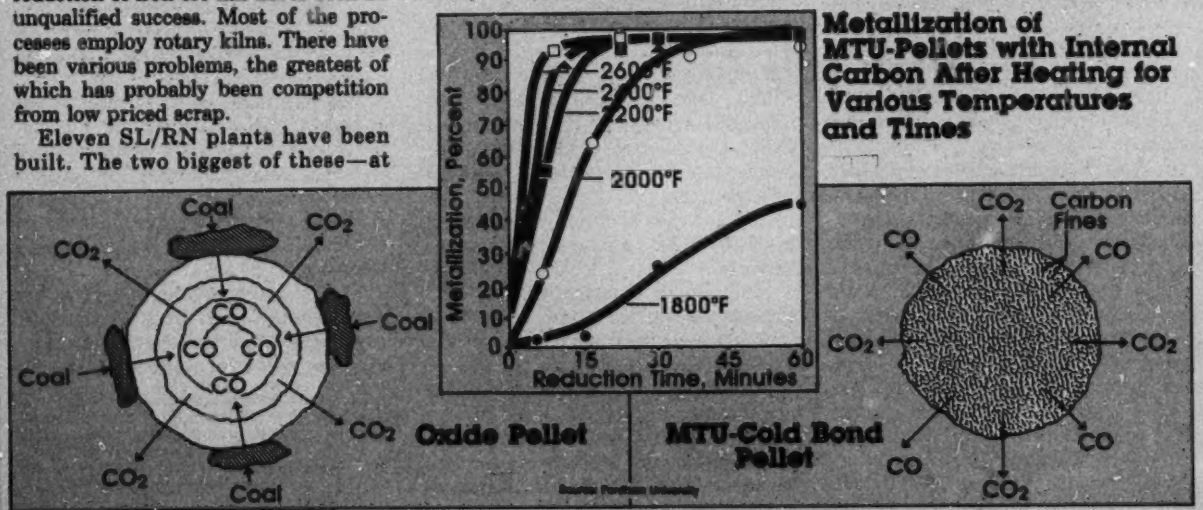
"We won't compete head-on with Midrex," says an official of CE Lummus. "The Midrex type process with cheap natural gas is tough to beat."

He does see RIOR making sense in a place like Venezuela, where a buildup of oil refining capacity is creating a big supply of petroleum coke.

Not really connected with direct reduction is the steelmaking concept that was being considered by Kaiser Steel Corp. This has apparently been shot down by the announcement that Kaiser intends to discontinue steel finishing operations as well as raw steel production.

At one time, Kaiser planned to shut down its blast furnace, but keep its rolling mills going. Serious thought was being given to making steel in the company's modern oxygen vessels with an all-scrap charge.

The KS (Klockner-Scrap) process is designed to melt scrap by injecting coal or some other form of carbon. Klock-

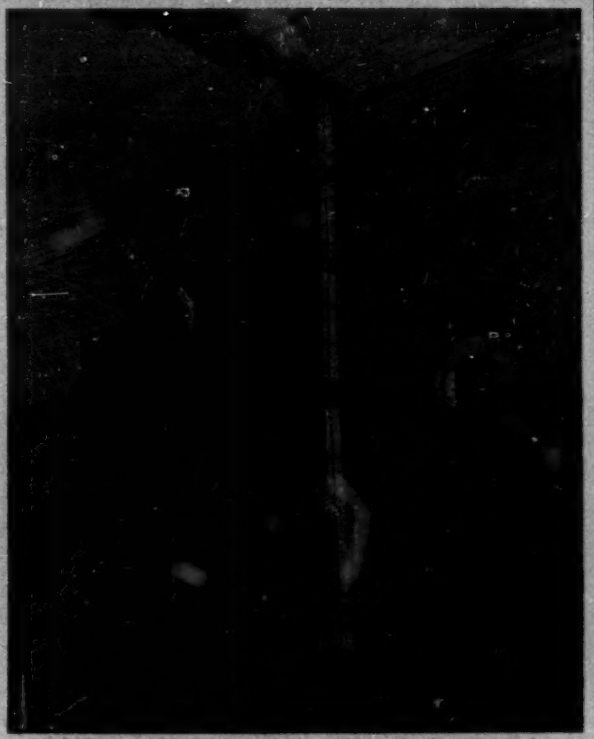


Metallization of MTU-Pellets with Internal Carbon After Heating for Various Temperatures and Times

Distributions of Estimated World Output of Steelmaking-Grade DRI

Millions of Net Tons	1979		1980	
Process	**Tons**	**Pct Total**	**Tons**	**Pct Total**
Midrex	4.13	55.6	4.37	55.5
HYL	2.43	32.7	2.61	33.1
Armco	0.23	3.1	0.24	3.1
SLRN	0.22	3.0	0.26	3.3
FIOR	0.22	3.0	0.25	3.2
Codir/Krupp	0.13	1.7	0.13	1.6
DRC/Hockin	0.03	0.4	0.01	0.1
Purofer	0.02	0.3	—	—
Kinglor-Metor	0.01	0.1	—	—
Accar	0.01	0.1	0.01	0.1
Totals	**7.43**	**100.0Pct**	**7.88**	**100.0Pct**

Source: Midrex Corporation.	1979		1980	
Country	**Tons**	**Pct Total**	**Tons**	**Pct Total**
Mexico	1.76	23.7	1.73	22.0
Venezuela	1.15	15.5	1.58	20.0
Canada	1.01	13.6	0.97	12.3
Argentina	0.92	12.4	0.86	10.9
United States	0.88	11.8	0.68	8.6
West Germany	0.56	7.5	0.49	6.2
Qatar	0.35	4.7	0.47	6.0
Brazil	0.34	4.6	0.31	3.9
New Zealand	0.17	2.3	0.17	2.2
Indonesia	0.14	1.9	0.41	5.2
South Africa	0.13	1.8	0.13	1.6
Italy	0.01	0.1	—	—
Peru	0.01	0.1	0.02	0.3
Trinidad	—	—	0.03	0.4
Iraq	—	—	0.02	0.3
India	—	—	0.01	0.1
Totals	**7.43**	**100.0Pct**	**7.88**	**100.0Pct**



A 150,000-ton plant which uses the ACCAR process developed by Allis-Chalmers came on-stream at Orissa, India in January.

ner, which has been closely associated with Q-BOP bottom blowing, has been working on the KS technique.

If the KS process is applied by someone and is successful, it will do two things. First, it will remove the ceiling that has been a big factor in holding down the price of scrap.

A second effect will be the generation of a great deal of reducing gas. Kaiser's Fontana shop, which has a suppressed combustion cleaning system, would have been equipped with a large gas storage vessel.

Kaiser had no plans for direct reduction. The off-gas was simply a valuable product of what is primarily a steelmaking operation. Pennsylvania Engineering Corp., which has built a number of Q-BOP vessels, is devising a system that would employ the off-gas for direct reduction.

In West Germany, gas is the primary product of a process that bears some resemblance to KS and has reportedly received government backing. The Humboldt process uses a liquid iron bath as a vehicle for gasifying coal. Coal, steam and oxygen are injected, producing a gas made up of carbon monoxide and hydrogen. Lime additions keep sulfur content to a very low level.

CRA, Ltd., of Australia and Klockner are participants in a plant that would employ the Humboldt process to gasify 860,000 tons of coal yearly at Klockner's Bremen Works. In a presentation last year, officials of KHD Humboldt showed how the gasification plant could be integrated with direct reduction.

The basic technology being employed in West Germany was developed by Applied Technology Corp. of Pittsburgh. Armco was once interested in this concept. The patent was taken over by the German group in 1978.

In a number of the new processes, the end product is liquid iron rather than metallized pellets. The Korf KR process (*IA*, Oct. 4, '82, p. MP-23) has two chambers. In the upper section, solid iron ore is partially reduced. In the lower section, coal is gasified while the iron goes through the final reduction and melting stage.

This feature shows up in the two-chamber process of Kawasaki Steel Corp. Designed to produce both iron and ferroalloys, this process makes a 60 to 70 pct reduction of iron in one chamber. In the case of chromium ore, there is a 30 to 50 pct reduction at a temperature of 1,770°F.

The final reduction in the main furnace takes place at temperatures up to 2,800°F for iron and up to 3,000°F for ferroalloy. The furnace operates on coke. Oxygen or air is injected through one set of tuyeres. Pre-reduced fine ore is blown in through upper tuyeres.

Kawasaki says the process reduces operating costs 15 pct when iron is made. For ferroalloys, says the company, the energy consumption is 50 pct less than with electric smelting.

The Plasmasmelt, Elred and Inred processes all come out with molten iron as the end product. All three use electric power. Plasmasmelt, as the name indicates, uses plasma to gasify coal and melt the iron.

Strictly speaking, any arc furnace employs plasma. However, the term is usually applied to a specific application of the concept. "It's generally heating some kind of gas and generally uses a non-consumable electrode," says M. G. Fey, manager of applied plasma systems, Westinghouse Electric Corp. "An arc is drawn between the electrodes and a gas is blown through."

The Westinghouse arc heater is used in both the Plasmasmelt and Plasmared processes. Mr. Fey is not too bullish about the outlook for early applications in the U.S.

"During this crunch, not much is being done on the development of new technology," he says.

Westinghouse is going ahead with a new plasma center near Pittsburgh. This should facilitate development of steel and non-steel systems. □

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EFFECTIVE MARCH 21, 1983

MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective March 21, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,585	1,566	15,482	19,506
Capability Utilization Rate	54.7	54.0	47.9	59.4

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.195
Pig Iron* * (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton = 2240 lbs.)	$ 72.83	$ 72.83	$ 75.17	$ 80.17
No. 2 bundles	$ 51.83	$ 51.83	$ 51.83	$ 52.83
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh .	$ 77.50	$ 77.50	$ 79.50	$ 88.50
No. 1 steel, Philadelphia	63.50	63.50	63.50	75.50
No. 1 steel, Chicago.....	77.50	77.50	82.50	76.50
No. 1 bundles, Detroit..	76.50	76.50	75.50	73.50
Low Phos., Youngstown	69.50	69.50	69.50	90.50
No. 1 mach'y cast., Pgh	79.50	79.50	79.50	86.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	113.50
No. 1 mach'y cast., Chi..	112.50	112.50	112.50	124.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective March 21, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	77.00-78.00	78.00	3/21/83
Lead	20.50-23.00	20.00-23.00	3/10/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00-40.00	40.00	3/1/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.25-$1.40
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $414.50
Indium, dollars per troy oz. $3.10
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$325-$350
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $10.61
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Mar. 14—559.24
Mar. 15—604.01
Mar. 16—603.88
Mar. 17—604.91
Mar. 18—603.93

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	75½	66¼
Yellow brass	63⅝	61¼
Red brass	69⅛	66⅛
Comm. bronze	70⅞	67¾
Mang. bronze.....	62¼	60½
Free cutting rod ends.....	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire.....	69
No. 2 copper wire.....	59
Light copper.....	50

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire.....	65
No. 2 copper wire.....	55
Light copper.....	46
No. 1 composition	53
No. 1 comp. turnings.....	49
Hvy. yellow brass solids	36
Hvy. yellow brass turnings.....	27
Radiators.....	43

Aluminum

New mixed clips	34	—35
Old sheet.....	32	—33
Old cast.....	32	—33
Clean dry borings	33	—34

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings.....	27	—28
Mixed L.C. clips.....	24	—25
Old sheets and cast	19	—20
Borings and turnings.....	13	—14
Duraluminum clippings.....	22	—23

Copper and Brass

No. 1 copper wire.....	58	—59
No. 2 copper wire.....	51	—52
Light copper.....	44	—45
Radiators.....	37	—38
No. 1 composition	46	—47
No. 1 composition turn'gs.....	42	—44
Cocks and faucets.....	32	—33
Clean heavy yellow brass	31	—32
Brass Pipe	31	—32
New soft brass clippings.....	46	—47

Lead

Heavy soft lead.....	10	—11
Whole batteries.....	4	— 5
Type metal	15	—16
Electrotype.....	17	—18

Nickel

Nickel solids.....	95	—100
Nickel rod ends.....	95	—100
Nickel sheets, clips.....	95	—100
Nickel turnings.....	45	— 50

Zinc

New zinc clippings.....	15	—16
Old diecast zinc	9	—10

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EFFECTIVE MARCH 21, 1983

MATERIALS NEWSFRONT

(Effective March 21, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 77.00 to	$ 78.00
No. 2 hvy. melting	67.00 to	68.00
No. 1 dealer bundles	91.00 to	92.00
No. 1 factory bundles (auto)	91.00 to	92.00
No. 2 bundles	54.00 to	55.00
No. 1 busheling	91.00 to	92.00
Machine shop turn.	13.00 to	14.00
Shoveling turnings	34.00 to	35.00
Cast iron borings	33.00 to	34.00
Low phos. punchings plate	91.00 to	92.00
Heavy turnings	67.00 to	68.00
No. 1 RR hvy. melting	84.00 to	85.00
Rails 2 ft. and under	94.00 to	95.00
Scrap rails, random lgth.	87.50 to	88.50
RR specialties	83.00 to	84.00
No. 1 machinery cast	79.00 to	80.00
Cupola cast	72.00 to	73.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	550.00 to	560.00
18-8 turnings	450.00 to	460.00

Chicago

No. 1 hvy. melting	$ 77.00 to	$ 78.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	87.00 to	88.00
No. 1 factory bundles (auto)	93.00 to	94.00
No. 2 dealer bundles	54.00 to	55.00
No. 1 busheling	84.00 to	85.00
Shredder scrap	80.00 to	81.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	41.00 to	42.00
Low phos. forge crop	92.00 to	93.00
Low phos. punchings plate ¼ in. and heavier	98.00 to	99.00
Low phos. 2 ft. and under	92.00 to	93.00
No. 1 RR hvy. melting	84.00 to	85.00
Scrap rails, random lgth.	76.00 to	77.00
Reroller rails	101.00 to	102.00
Rails, 2 ft. and under	97.00 to	98.00
RR couplers and knuckles	86.00 to	87.00
RR car axles	109.00 to	110.00
No. 1 machinery cast	112.00 to	113.00
Cupola cast	97.00 to	98.00
Stove plate	94.00 to	95.00
Steel car wheels	86.00 to	87.00
Stainless		
18-8 bundles and solids	515.00 to	525.00
18-8 turnings	415.00 to	425.00
430 bundles and solids	130.00 to	135.00
430 turnings	95.00 to	100.00

Philadelphia

No. 1 hvy. melting	$ 62.00 to	$ 65.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	79.00 to	82.00
No. 2 dealer bundles	45.00 to	48.00
No. 1 busheling	79.00 to	82.00
Shredder scrap	77.00 to	80.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	40.00 to	43.00
Low phos. 5 ft. and under	79.00 to	82.00
Low phos. 2 ft. punchings	91.00 to	94.00
Electric furnace bundles	95.00 to	98.00
RR specialties	79.00 to	82.00
Rails, 2 ft. and under	93.00 to	96.00
Cupola cast	60.00 to	63.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	76.00 to	77.00
No. 2 bundles	32.00 to	33.00
No. 1 busheling	73.00 to	74.00
Drop forge flashings	47.00 to	48.00
Machine shop turn.	29.00 to	30.00
Mixed borings and turn.	14.00 to	15.00
Shoveling turnings	29.00 to	30.00
Cast iron borings	13.00 to	14.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	69.00 to	70.00
Stainless		
18-8 bundles and solids	430.00 to	440.00
18-8 turnings	310.00 to	320.00
430 bundles and solids	120.00 to	130.00

Youngstown

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	79.00 to	80.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	69.00 to	70.00
Electric furnace bundles	75.00 to	76.00
Galvanized bundles	65.00 to	66.00

Cleveland

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	77.00 to	78.00
No. 1 factory bundles	89.00 to	90.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	77.00 to	78.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	95.00 to	96.00
Low phos. punchings plate	95.00 to	96.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	99.00 to	100.00
Rails, 18 in. and under	100.00 to	101.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	89.00 to	90.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	275.00 to	285.00
18-8 turnings	225.00 to	235.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 busheling	38.00 to	39.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.	9.00 to	10.00
Mixed bor. and turn.	16.00 to	17.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	15.00 to	16.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	50.00 to	51.00
Scrap rails, random lgth.	30.00 to	31.00
No. 1 machinery cast	71.00 to	72.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	53.00 to	54.00
Foundry steel, 2 ft.	53.00 to	54.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	50.00 to	51.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	64.00 to	65.00
Rails, random length	61.00 to	62.00
Rails, 18 in. and under	76.00 to	77.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	82.00 to	83.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	96.00 to	97.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 58.00 to	$ 59.00
No. 2 heavy melting	56.00 to	57.00
No. 1 dealer bundles	58.00 to	59.00
No. 2 bundles	43.00 to	44.00
No. 1 busheling	58.00 to	59.00
Shredder scrap	74.00 to	75.00
Machine shop. turn.	21.00 to	22.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	31.00 to	32.00
Electric furnace bundles	58.00 to	59.00
Elec. furnace, 3 ft. & under	56.00 to	57.00
Structural and plate, 2 ft.	79.00 to	80.00
Structural and plate, 4 ft.	71.00 to	72.00
No. 1 RR hvy. melting	59.00 to	60.00
Scrap rails, random lgth.	60.00 to	61.00
Rails, 18 in. and under	79.00 to	80.00
Angles and splice bars	73.00 to	74.00
No. 1 cupola cast	77.00 to	78.00
Unstripped motor blocks	52.00 to	53.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 dealer bundles	59.00 to	60.00
No. 2 bundles	30.00 to	31.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	11.00 to	12.00
Low phos. 18 in. and under	78.00 to	79.00
Rails, random length	60.00 to	61.00
Rails, 2 ft. and under	82.00 to	83.00
No. 1 cupola cast	65.00 to	66.00
Heavy breakable cast	29.00 to	30.00
Drop broken cast	69.00 to	70.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	455.00 to	475.00
18-8 turnings	340.00 to	365.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	40.00 to	42.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	40.00 to	42.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	33.00 to	35.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 dealer bundles	12.00 to	14.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	29.00 to	31.00
No. 1 dealer bundles	27.00 to	29.00
No. 2 dealer bundles	9.00 to	11.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 58.00 to	$ 60.00
No. 2 hvy. melting	47.00 to	49.00
No. 2 bundles	36.00 to	38.00
No. 1 cupola cast	92.00 to	94.00
Mixed yard cast	79.00 to	81.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 43.00
No. 2 heavy melting cut 2 ft. and under	40.00
No. 1 dealer bundles	50.00
No. 2 bundles	20.00
Mixed steel scrap	24.00
Bush. new fact. prep'd.	48.00
Bush. new fact. unprp'd.	40.00
Machine shop turn.	23.00
Short steel turn.	26.00
Mixed bor. and turn.	15.00
Cast scrap	40.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	49.00 to	50.00
No. 2 bundles	34.00 to	36.00
Machine shop turn.	18.00 to	19.00
Crushed turnings	33.00 to	35.00
Shredder scrap	64.00 to	65.00
Cut structural plate 2 ft. and under	84.00 to	86.00
Unstripped motor blocks	60.00 to	62.00
Cupola cast	69.00 to	71.00

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STEEL PRICES

Codes identify Producers listed in the Key on page 73. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest
W5 $366.00
N4 $366.00
West
C6 $346.00
Carbon Forging, East
B3(3), C10, U1 $453.00
R3 $453.00
Midwest
R3, U1, W5 $453.00
S1 $453.00
C10 $453.00
K2 $453.00
W5 $453.00
West
B3(2) $463.00
C6 $453.00
South
A7 $453.00
Alloy, East
R3, C10 $492.00
B3 $492.00
Midwest
W8, W5, C10 $492.00
S1, U1 $492.00
R3 $492.00
West
B3 $502.00
C6 $489.00
South
A7 $492.00

Piling Sheet Steel

(cents per lb)

Midwest
U1 26.45

Structurals

Carbon, East
B3(2) 23.90
U1, J3 23.90
Midwest
A7 24.15
C20 22.90
W8 22.90
I3, T10, U1, N4 23.90
West
C6 25.10
U1 24.40
B3(2) 21.65
South
C16, U1 23.90
T10 22.90
A8 Cmp*
High-Strength, Low Alloy, East
B3(2) 23.90
U1, J3 23.90
Midwest
N4 23.90
W8 24.15
U1 23.90
I3 23.90
West
U1, A7 24.40
B3(2) 21.65
South
U1, C16 23.90
Wide Flange, Carbon, East
B3 23.90
U1, A7, J3 23.90
Midwest
U1 23.90
N4 23.90
I3 23.90
West
U1 24.40
C6 24.15
South
A7 24.15

Strip

Hot-Rolled, Carbon, Cut ll Edge—all widths, East
B3, U1 22.05
J3 22.05
Midwest
A7, D1 22.05
I4 20.20
S1, J3, D1 22.05
W3 22.05
N4 22.55
W5 22.05
U1 22.05
B3, G2, I3, M2, R3, G3 22.05
West
K1 20.80
B3 24.70
South
R3 22.05
Cold-Rolled, Carbon Max. 25%, East
E4 29.75
R7, S10, B4 29.60
P15 24.80
S7 Cmp*
U1 35.30
D1(1) Cmp*
B4 31.55
Midwest
G4 24.80
I4 30.15
W14 22.95
S1, J4 34.05
T4 Cmp*
*Composite pricing
West
U1 33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, (plus extras)
Midwest
M2, G3, R3, W3, I4, J3, G2, I3 22.05
A7 22.05
S1 22.05
West
K1 22.05
South
R3 22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East
R7 29.00
Midwest
S1 32.00
Alloy, Hot-Rolled, Midwest (plus extras)*
S1 24.60
G4 25.80
I4 22.70
Alloy, Cold-Rolled, East
C11, E4, M8 43.35
R7 32.75
B4 42.60
P15 32.10
Midwest
I4 39.40
S1 42.30

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East
B3 22.05
J3 22.05
U1 22.05
Midwest
A7, U1, B3, G2, G3, I3, M2, R3, W3 22.05
S1, W5, D1 22.05
J3 22.05
I4 19.90†
West
U1 21.30
K1 22.05
South
R3 22.05
Cold-Rolled, East, Class I
B3(2), U1 26.15
J3 26.15
Midwest
B3, I3, G3, R3, M2, U1(2) 26.15
G2, W3, M11 26.15
I4 22.00
J3, A7 26.15
S1, W5, D1 26.15
West
U1 26.65
South
R3 24.65
Galvanized (hot-dipped), East
B3(2), U1 28.00
Midwest
J3, D1 28.00
I3, W5, S1 28.00
U1, A7, R3, Y1 28.00
G2, W3, M11 28.00
West
K1 27.15
U1 28.50
South
U1 28.00
R3 28.00
Enameling, Midwest
A7, I3, U1, J3 27.65
S1 26.50
Long-Terne, Midwest
W5 28.30
A7, U1 29.35
R3 29.35
†Actual weight basis

Wire Rod

East
B3(2) 22.35
U1 22.35
Midwest
N4 22.35
U1, K2 22.35
West
A7 22.00
C6 21.45
B3 23.25
South
G7 22.35

Tinplate

Electrolytic Tinplate
Single Reduced (70 lb)

East	per base box
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$26.79
U1	26.79
South	
U1	$26.29

Double Reduced (55 lb)**

Midwest	
M11 (50 lb)	$21.49
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$21.99
U1	21.99
South	
U1	$21.49

Black Plate
Single Reduced (75 lb)*

East	
B3	$24.01
Midwest	
J3	$24.01
M11	24.01
I3, U1, W5	24.01
W3	24.01
West	
K1	$24.01
U1	23.36

Double Reduced (55 lb)

East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

*70 lb—base weight extra 45¢
**50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled
(Special quality)
East
R3, K3 25.80
R5 25.80
B3(3), J3 25.80
U1, C10 25.80
Midwest
A7 23.95
U1, I3, I4, C20, N4 25.80
R3, T10 25.80
K2 25.80
I3 19.50*
West
B3 25.80
C6 24.45
B3 24.70
South
A8 20.65
A7 25.80
C16 25.80
Cold-Finished Carbon, East
A11 22.15
R3 33.75
C21 21.15
J3(4), L2 31.00
C2 23.025
M8, W10, T11, S8 31.00
N1 24.475
R4 22.25
B4 31.00
M1 23.025
B4, C10 31.00
Midwest
B5, W10, Y1, W8, R3 33.25
J3 31.00
B1 19.80
L2 30.75
N9 31.00
P3 19.85 + CMS
W14 22.20
J3(3) 31.00
B5 31.25
J3 31.00
West
B5 31.20
B5 34.90
R3 37.15
South
B5 32.85
J3 34.00
C16 24.40
J3 31.95
Alloy, Hot-Rolled, East
B3(2), R5, K3, C10, U1 27.95
R3 27.95
J3 27.95
Midwest
A7, U1, R3 27.95
I3, C10 27.95
I4 24.85
I3 21.00*
West
B3 27.95
B5 18.50
C6 26.60
B3 27.10
South
A7 24.85
A8 22.00
Alloy, Cold Drawn, East
L2 35.20
R3, N1, C2 37.90
M1 28.025
R4 25.65
A11 30.50
J3, W10, L2 34.85
T11, S8 34.85
C10 34.85
J3(2) 34.25
Midwest
B5, R3, C10 37.35
C2 28.275
J3, M9, W10 34.85
P3 22.75
B1 22.70
N9 34.85
L2 34.65
B5 35.10
J3 36.00
J3 34.85
West
R3 40.75
B5 35.20
B5 38.25
South
J3 35.85
C16 28.00
B5 36.75

Plates

Carbon Steel, East
B3(2), U1 25.75
L4 25.75
P2 25.75
J3 26.75
Midwest
B3, S1 25.75
I3 25.75
J3, A7 22.80
U1, I4 25.75
R3 26.75
West
A7, B3, C6, O2 24.25
K1 23.50
U1 25.75
South
R3 25.75
A7 25.75
U1 25.75
Alloy, East
B3, J3 33.55
U1, L4 33.55
P2 33.55
J3 34.55
Midwest
B3 33.55
G2, G3 33.55
I4, U1 33.55
West
B3 33.55
O2 30.55
K1 31.30
South
A7 27.55

Wire

Carbon Steel Wire, East
B3(2) 27.10
U1 27.70
A11 22.15
Midwest
U1 27.70
A7, R3 24.60
N4, W7 27.40
K2 24.20
South
A8 22.85
West
A7 25.95
C6 24.95

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C8 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N8 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelson Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities* / City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	22.25	27.91	31.51	31.86	24.27	26.45	17.89	32.91	42.10	52.60	69.58	73.19
Baltimore	32.25	24.49	32.76	34.74	26.83	31.13	22.17	36.44	55.85	59.91	67.79	76.32
Birmingham	22.27	28.05	32.24	31.99	24.06	26.26	17.99	33.40	49.31	68.90	68.16	74.43
Boston	23.43	28.25	31.93	44.27	37.43	37.68	21.80	47.75	57.60	60.56	68.49	75.74
Buffalo	27.75	34.41	36.35	43.01	35.20	32.46	18.26	45.85	54.11	55.64	62.09	70.72
Chicago	22.26	28.66	31.01	29.34	26.76	27.28	15.83	35.60	35.94	42.45	49.53	54.47
Cincinnati	23.88	29.74	32.95	33.30	25.91	29.26	16.14	35.37	35.17	40.90	46.23	51.50
Cleveland	28.85	32.41	34.98	32.65	27.78	31.36	17.55	39.97	38.36	48.08	53.89	59.83
Denver	32.69	38.65	38.66	42.32	36.91	38.18	22.79	49.35	56.13	65.40	72.50	81.22
Detroit	24.88	31.65	32.95	33.74	26.31	26.79	16.83	37.64	36.87	40.55	46.63	52.90
Houston	23.83	28.26	32.53	41.35	34.12	37.90	17.16	38.14	36.36	42.15	50.79	56.90
Kansas City	23.37	27.16	31.59	30.36	30.20	34.55	17.37	43.29	41.88	50.92	56.17	63.93
Los Angeles	30.02	38.03	39.14	45.66	37.13	38.95	33.49	50.38	62.24	72.33	77.74	89.22
Memphis	31.68	36.62	36.40	38.57	30.45	34.49	21.97	41.48	52.82	56.96	67.85	77.44
Milwaukee	22.92	29.30	31.79	31.10	28.50	29.20	15.71	36.06	36.86	47.20	52.71	59.02
New York	22.00	26.53	30.70	42.40	31.67	32.93	20.83	48.87	50.98	58.83	68.45	75.35
Philadelphia	29.67	35.27	37.96	45.73	32.21	33.85	22.93	46.36	50.66	58.71	67.13	74.37
Pittsburgh	24.35	28.58	32.34	41.36	33.32	28.10	26.00	43.90	48.95	59.86	66.19	72.84
Portland	32.04	37.16	41.51	33.10	34.82	38.20	53.64	56.85	61.00	64.10	66.10	....
San Francisco	29.27	35.77	39.71	45.05	38.70	39.18	31.92	51.14	62.56	71.65	77.93	86.10
Seattle	29.85	35.14	37.68	46.76	32.89	35.32	29.86	51.38	64.02	70.14	73.83	87.67
Spokane	21.08	30.56	33.56	35.69	35.18	25.16	20.32	41.00	42.02	45.30	....	58.32
St. Louis	25.80	30.08	33.47	36.51	29.30	32.55	19.08	41.07	43.13	51.08	58.11	63.64
St. Paul	23.43	27.76	32.10	35.20	29.31	32.38	16.87	43.07	39.20	48.63	51.53	60.75

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ¾-2^{15}/$_{16}$; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1⅛" round; Cold drawn—1" round; Hot-rolled 4140—1⅛" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

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METALWORKING PRICE TRENDS

Price trend from soft to softer may be dead-ending

The leader in continuing price softness is energy goods.

In February, energy prices fell by 2.9 pct at the producer level. This was the third straight month of energy price deflation.

In January, these prices fell by 4.2 pct—a record for a month-to-month decline.

Prices of natural gas, however, rose 3.2 pct in February. But that is nothing new for gas prices.

Due largely to government price decontrol of new-gas prices, natural gas prices overall rose a staggering 20.7 pct last year.

In metalworking goods lines, prices of autos were up 1.5 pct on a seasonally adjusted basis. That, according to one auto industry analyst, was due to a combination of a swing to costly larger cars and a widespread boost in actual selling prices. The price boosts came as dealers marked up tags and sold more on the basis of reduced auto-finance interest charges.

In *Iron Age's* list of 22 key metalworking product lines, advances in February were led by electric motors, fluid power equipment, plumbing fixtures and metal containers. These price moves, it is widely felt, reflected stepped-up market demand as the recession seemingly came to an end.

Still in metalworking generally, producer prices were in a softening mode in February. Five product lines showed actual price declines during the month, and four showed no price moves at all.

The recent great shift in price trends is getting to be old hat for U.S. manufacturers, including metalworking. In the aftermath of the 1973-75 recession, producer finished goods prices fell from a 18.3 pct rise rate in 1974 to 3.7 pct in 1976.

This time around, prices have tumbled from 11.8 pct in 1980 to a February 1983 rate of about 3.1 pct.

"It's not the price cuts that hurt," says one metalworking executive. "It is the policy and process that produces the cuts that hurts."

This executive refers to money supply restraints that broke prices, but also led to huge worker layoffs and other disruptions in his, and other, companies.

Producers prices now seem 'settled in' at about the 3.0 pct to 3.5 pct annual rate level.

With business activity now improving, the days of plummeting price advances is probably at an end.

Latest Month Covered: February, 1983

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	375.2	+ 0.4	+ 3.7
Metal Forming Machine Tools	414.4	+ 0.3	+ 4.0
Agricultural Machinery & Equip.	322.5	+ 0.3	+ 5.9
Construction Machinery & Equip.	348.1	− 0.1	+ 3.0
Industrial Process Furnace & Ovens	356.9	0	+ 4.2
Industrial Material Handling Equip.	285.3	− 0.5	− 0.7
Pumps, Compressors & Allied Equip.	349.4	− 0.1	+ 1.2
Fluid Power Equip. (Dec. 1970 = 100)	251.4	+ 1.0	+ 4.4
Mechanical Power Transmission Equip.	314.2	+ 0.4	+ 1.0
Automobiles	218.9	0	+ 4.0
Motor Trucks—Light	275.5	+ 0.1	+ 8.9
Motor Trucks—Heavy	317.5	0	+ 6.8
Railroad Equipment	357.3	− 0.1	+ 3.3
Fabricated Metal Structural Products	302.5	− 0.3	− 0.5
Electric Motors	302.3	+ 1.2	+ 3.5
Valves (Metal, Ex-Fluid Power—Dec. 1982=100)	100.8	+ 0.5	NA
Ball & Roller Bearings	331.2	+ 0.1	+ 2.9
Cutting Tools & Accessories	272.8	+ 0.2	+ 1.6
Heating Equipment	240.8	+ 0.3	+ 3.3
Plumbing Fixtures & Brass Fittings	283.4	+ 1.0	+ 2.5
Metal Containers	330.3	+ 1.0	+ 1.3
Miscellaneous Metal Products	288.6	0	+ 3.6

Data based on U.S. Labor Dept.'s Producer Price Index

Chilton's

APRIL 13, 1983

IRON AGE

THE MAGAZINE FOR METALWORKING MANAGEMENT

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TECH: CAN IT TURN US AROUND?

SPECIAL ADVERTISING SECTION: MATERIAL HANDLING AND THE FACTORY OF THE FUTURE

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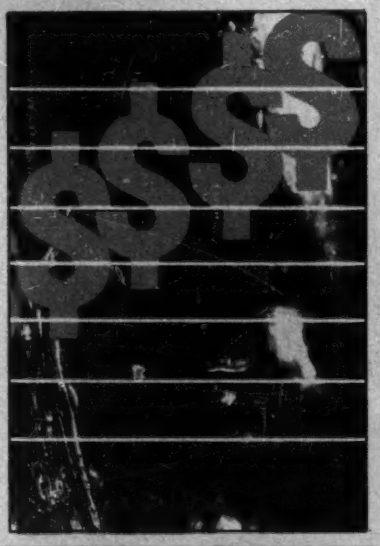
VOL. 226, NO. 11

IRON AGE

APRIL 13, 1983



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Although our expectations of new technologies are high, these industries won't transform the economy singlehandedly. They simply can't grow fast enough and large enough to pick up all the slack. High-technology and basic industries on the same side of the equation, though, can add up to economic survival.

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Manufacturing Systems Series 39: The scramble to stay ahead in the robot industry

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facility near Rocky Mount, N.C.

The new B and C Series diesel engines to be produced at the plant will allow Cummins to expand its product line down to 50 hp by 1986.

Manufacturing will be at a much higher volume (150,000 units a year) than anything Cummins has done previously. To achieve that output, the firm decided to use transfer lines and manufacture only blocks, heads and rods. Because the lines permit little manufacturing flexibility, engine variation will begin on the assembly line. An even broader range of products will be assembled by distributors from kits supplied by Cummins.

The new plant features an 18-machine cylinder block line from The Cross Co., Fraser, Mich., a cylinder head line by F. Joseph Lamb Co., Warren, Mich., and a connecting rod transfer line from Alfing Kessler, West Germany.

Speeding up production has made Cummins rethink many of its manufacturing philosophies. "Test cells, for example, used to require that completed engines run an hour or an hour-and-a-half, in order to check performance. We had to get that time down to six minutes," said Philip E. Jones, vice president of engine projects.

"In addition to new products in our traditional heavy-duty markets, development of our new B and C series engines to serve the light- and medium-duty markets from 50 to 250 hp is on schedule," said James A. Henderson, president. "The first model, a four cylinder B engine for light industrial equipment will be in production in July."

GMF Robotics expects to lead market by 1985

GMF Robotics, the joint venture between General Motors and Fanuc of Tokyo, plans to be the top seller of robots in the U.S. by 1985. The company predicts it will capture 27.5 pct of the U.S. robot market that year.

GMF plans to break ground this year for a new plant in the Detroit area that will be completed by next year. The plant, which initially might cover 60,000 sq ft and employ 50 people, first would assemble robots; later, it would expand to do machining operations, too.

GMF presently assembles only the numerically controlled paint sprayer in the U.S. That's done in the Detroit area. All the other GMF products are made in Japan.

Presently, General Motors accounts for 75 pct of GMF's sales.

"We won't be comfortable," says Philip V. Monnin, vice president, sales, GMF Robotics, "until GM accounts for less than 50 pct of our sales."

GMF presently is negotiating with Ford for a number of products. GMF would like Ford to use its paint sprayer to paint one of the new Ford models. Ford already is using a Fanuc robot in its plant in Batavia, Ohio.

In Europe, GMF has sold its paint sprayer to Daimler-Benz and BMW.

Fanuc robots probably will account for 80-90 pct of GMF's total sales through 1985, estimates Mr. Monnin. In 1982, GMF sold 50 Fanuc robots and 40 painter arms. So far in 1983, GMF has sold 99 Fanuc robots and four painter arms.

GMF's view of the robot market and its share

	Robots sold by total U.S. industry	Robots sold by GMF
1982	3075	90
1983	4000	900
1984	5600	1300
1985	8000	2500

Fanuc alone already has captured 50 pct of the world market for numerical controls. It has 50 pct of the U.S.; 50 pct of the European and 75 pct of the Japanese market for numerical controls.

"In the U.S.," says Mr. Monnin, "Fanuc outsells Allen-Bradley, GE, Bendix, and Westinghouse all put together."

Fanuc, then, brings its expertise in hardware to the joint venture. GM's contribution is its expertise in software.

GMF's strength as a robot maker is its wide range of products and low prices. It has 17 basic robots. By contrast, Asea and Cincinnati-Milacron offer three basic models.

By 1983 to 1984, says GMF Robotics President Eric Mittelstadt, the S3 robot will account for about two-thirds of GMF's sales. The S3 is intended primarily for spotwelding.

The S3 is one of the products developed jointly by GMF since it began last year. The project began in August, 1982 and was finished by the end of 1982.

"That's a phenomenal development time," says Mr. Monnin. "The competition would take 2½ to 3 years to develop the same product."

The GMF product line ranges from the simple, air-operated Model M-00, which sells for a base price of $14,000 and is used to load and unload, to the numerically controlled paint sprayer developed by GM.

West Coast company resurrects the Bug

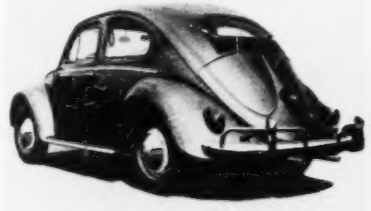
The Volkswagen Beetle seemed to win a fond place in many American hearts—at least until 1977 when the automaker stopped exporting them to the United States and hatched plans for the more expensive and redesigned Rabbit.

Now a California entrepreneur has resurrected the popular bug. A Solana Beach, Calif. company called People's Car Co. has discovered a supply of new VWs in Puebla, Mexico, near Mexico City and is importing the workhorse vehicle into the U.S.

Lenny Macchiarella, who owns the company, says he discovered that new Beetles still were manufactured at the Mexican facility during a recent trip south of the border.

Mr. Macchiarella and a business partner, Danny Nager, learned that only Mexican citizens could buy the car at a price of about $3,800. They have arranged for a Mexican company to purchase the vehicles, have filed the necessary paperwork with U.S. Customs and have contracted with a Newport Beach company to make the necessary modifications to bring the Mexican Beetles up to compliance with U.S. safety and environmental regulations.

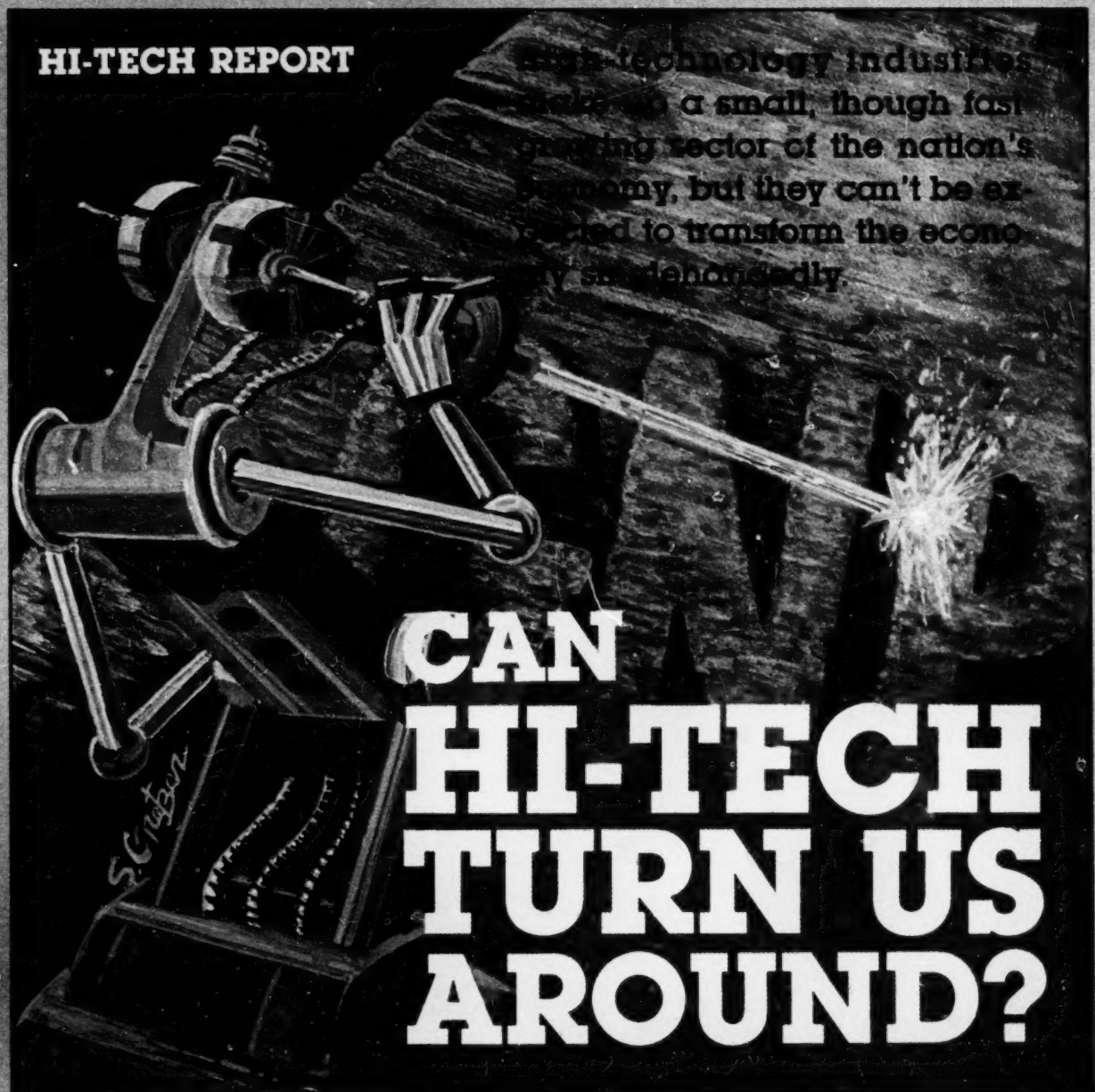
It would probably cost an individual owner up to $7,000 to make the necessary modifications on the car, but by dealing in bulk Mr. Macchiarella has cut the cost to about $2,500. The Beetle retails through People's Car for $6,995. Options can up the price to $9,500.



Could this be the newest auto import threat to worry Detroit?

Volkswagen of America won't give U.S. owners a warranty on the Mexican cars, so People's Car guarantees the auto's performance for 12 months or 12,000 miles.

A full-scale Beetle revival is probably a long way from occurring, however. Mr. Macchiarella will sell only about 400 of the cars this year and perhaps 1,000 annually later.



CAN HI-TECH TURN US AROUND?

BY LESLIE GOLDWATER

High technology: Managers, workers, politicians and economic planners across the land see it as the great savior come to rescue us from the ill fates of recession and industrial decline, and lead us into the promised land of economic growth and prosperity.

That is the hope—here are the facts: High-technology goods contributed to about 8.1 pct of the gross national product (GNP) in 1980, or about 25 pct more than they had a decade before. High-technology industries accounted for 75 pct of the net increase in *manufacturing* jobs from 1955 to 1979, according to a study by the Joint Economic Committee of Congress. Perhaps most significant for the long term, 23.2 pct of high-technology industries' value added was spent on research and development (R&D) in 1980, as compared to 7.2 for all manufacturing industries.

No wonder everyone's trying to jump on the high-technology bandwagon. But how many of us can it hold and how far will it take us?

There is increasing concern that the new glamour industries will not bring the economic salvation being promised, that the "numbers" are deceptive, that the growth simply will not provide sufficient jobs for the American people. The recession has shown that even high technology is not immune to economic pneumonia.

Before we can analyze what high technology can or

(Cont. on p. 49)

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cannot do for our economy, and what its effect will be on metalworking in particular, we first have to decide what high technology is. Despite widely varying perceptions and definitions, there are some areas of consensus. High-technology companies generally are agreed to be labor- or brain-intensive rather than capital-intensive; science-based, or involving applications of scientific advances; employing scientists, engineers and technicians; and having a high R&D component. (For a thorough discussion of the definition, see box, p. 53.) The industry stretches all the way from guided missiles to synthetic insulins to desktop computers, with hundreds of products, hard and soft, in between.

Most economists see high technology as having strong long-term potential in light of all industries' concern with cutting costs while improving productivity, quality and efficiency. Their enthusiasm for hi-tech is tempered, however, by some of the realities.

"Anyone who believes it is the solution for all our problems is enormously exaggerating," says Lawrence Chimerine, chairman and chief economist, Chase Econometrics. "It is still a fairly small sector, it's not highly employment-intensive and there's lots of competition, including foreign," he adds.

"The expectation that high technology is going to bail out the economy, frankly, is unrealistic," says John Albertine, president of the American Business Conference, whose members are small and mid-sized high-growth firms.

Layoffs of thousands in the semiconductor industry last year proved painfully that the recession would penetrate, though less quickly and severely, the high-technology bubble. After years of spectacular growth, the semiconductor industry was flat last year, though the imminent economic recovery promises a new spurt of growth. Other hi-tech industries also suffered temporary setbacks during the recession.

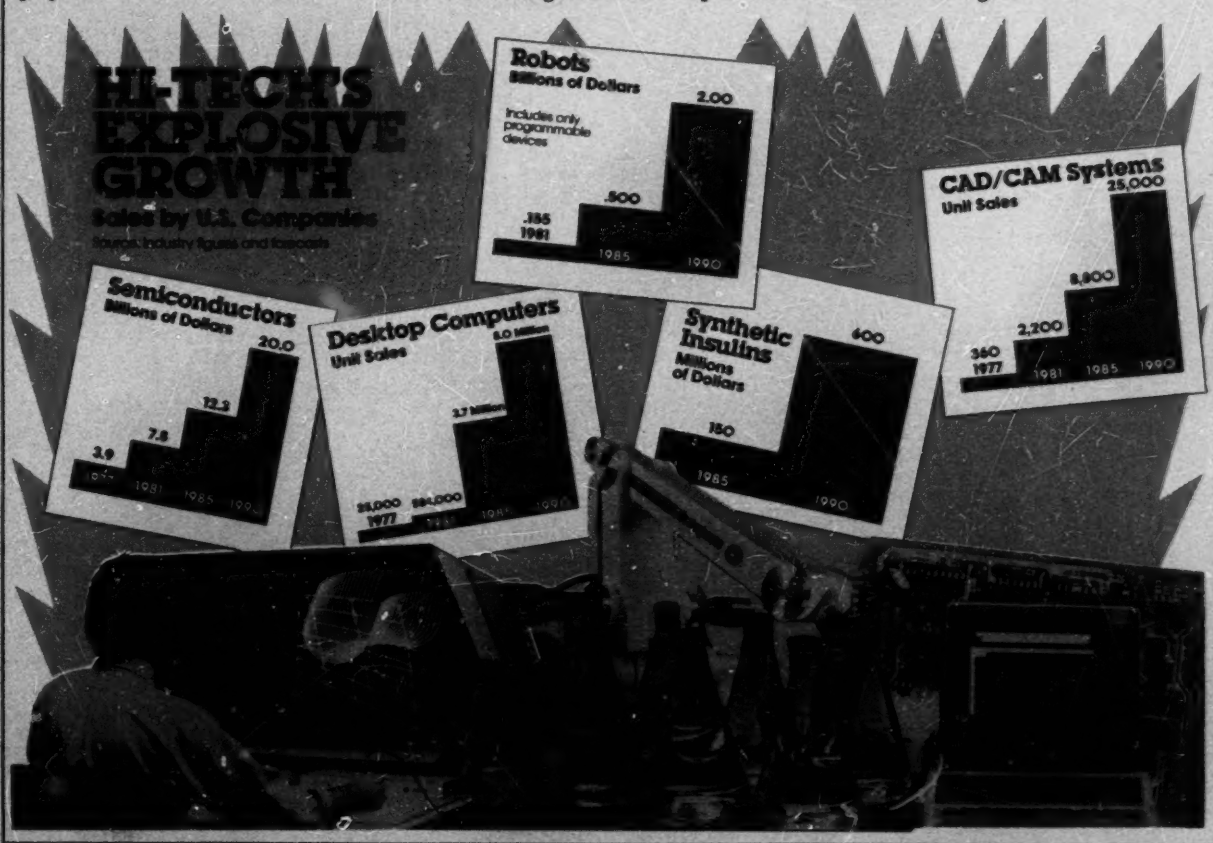
High technology is subject to the winds of trade and competition, as well as to the vagaries of economic cycles. Competition already is making it difficult for new entries in certain hi-tech industries. Some 36 states and innumerable counties and cities have established hi-tech development commissions to attract the new industries (see box, p. 57). Foreign competitors are breathing down the necks of U.S. manufacturers.

The strong dollar has helped make American products expensive abroad and foreign imports cheaper. Hi-tech is feeling the heat.

Howard Foley, who heads the Massachusetts High Technology Council, says there's always a danger that foreign competition will overwhelm the U.S. industries, but he sees substantial changes ahead in the international business structure that may make foreign competition a non-issue.

"When you follow this down, we're not going to see U.S., French, German or Japanese companies. We're going to see companies employing the best possible talent from around the world," predicts Mr. Foley. "It's going to be companies against companies, not countries against countries," he adds.

Mr. Foley, like his counterparts across the country, sees hi-tech as one means for transforming a local economy's dependence on mature industries. New England provides a unique example of just how hi-tech growth has affected a traditional manufacturing economy. Bennett Harrison, an economist at Massachusetts Institute of Technology, studied the economic changes occurring in the region since World War II, and found that perhaps the new industries have not entirely revitalized the region.



In his three-year study, Dr. Harrison found that "for all the attention it has commanded, the high-tech sector has not yet achieved the dominance once held by the mill industries." While acknowledging hi-tech's significant growth in New England, Dr. Harrison points out that "between 1976 and 1978, in the most important high-tech state in the region, three new jobs were created in other segments of the private economy of Massachusetts for every new job created in high tech."

He adds that the region continues to have the lowest real wages in the U.S., for all occupations. And the outlook indicates an increase in the geographic dispersal of jobs from New England-based high-technology firms. The study's conclusions do not necessarily provide a model for what may occur in a transformation of the entire economy of the nation, but they do offer evidence that high-technology industries will not solve a slew of economic problems faced by local economies once dependent on traditional manufacturing, and even positive effects will be gradual.

How long before the growth of high technology will have a significant impact on our economy? There is some disagreement among experts as to the size and timing of the impact, but most agree that the effect won't be felt quickly.

"In the short range, the unemployment problem will lag a long time, as the young come into the job market and older workers are not reabsorbed," says Dan Berg, provost, Carnegie-Mellon University. "But I am very optimistic. It may take five or ten years to hit the market, but there's already a rejuvenation going on," he adds. John Albertine says the impact is "ongoing, but the major benefits are a decade away."

The phenomenal growth rates in high technology may level off in specific areas as some current technologies are made obsolete by new, even higher technologies. Dr. Chimerine forecasts that in 10 to 20 years, the spectacular growth of personal computers will slow, while the mainframe market already has slowed considerably. Communications, cable television, transmission of data, etc., will continue to grow for a long time—"it's a big, untapped market," he says. Biotechnology is such a new field that it's peak is quite far off.

Far-off results haven't scared off the politicians. Many are adopting technology-focused industrial policies as the cornerstone of their platforms. Some of the so-called Atari Democrats hail from the hi-tech centers—Sen. Gary Hart (D., Colo.), Sen. Paul Tsongas (D., Mass.), Rep. Leon Panetta (D., Calif.); others from traditional manufacturing states that are trying to change their image—Sen. Bill Bradley (D., N.J.), Rep. Howard Wolpe (D., Mich.), Rep. Richard Gephardt (D., Mo.).

A bipartisan group from Congress formed an economic task force last summer to analyze the "engines of post-war economic growth" and determine whether the new technology industries can power our economy into the next century. The conclusions of the study's first phase credit the auto-highways-housing relationship with seeding the economy of the last three decades; the second part of the study will evaluate high technology as a potential replacement.

Even if the government's industrial policy readjusts the balance of efforts and resources toward high-technology and basic industries, the two will maintain a certain symbiosis, a mutual dependence for survival and growth.

Hi-Tech vs. the Basics

Some are drawing economic battle lines of hi-tech vs. basic industries. A closer look reveals a mutual dependence of the two.

The efforts to redirect resources to the development of high-technology industries are, unfortunately, often characterized as a contest between hi-tech and basic industries. Ironically, advanced technology may be a blessing, not a threat, to our older industries. It is emerging as part of a solution for improving the quality and efficiency of our basic industries, not for replacing them.

That point has not been lost on leaders in those industries. "Let me state in very strong terms that anyone who sees the future of our economy as a contest between high-tech and basic industry has some rethinking to do. Advocating the abandonment of basic industry in favor of technology and service industries suggests the advocate is either a fool or an idiot," said David M. Roderick, chairman, U. S. Steel Corp., in a recent speech.

Philip Caldwell, chairman of Ford Motor Co., said at the 1982 annual meeting, "Whether it is in quality or product leadership, or in manufacturing efficiency, technology is fundamental to success."

Gerald Michael, of Arthur D. Little Inc.'s CIM (Computer-Integrated Manufacturing) Group, says that in a difficult economic climate, it is understandable that the public perceives hi-tech as threatening. "Once things turn around, people will realize that new technologies improve productivity, that they create, not take away, jobs. Over the past decade, in automotive, job loss was the result of lack of productivity, not automation. . . . High technology can stem that tide, in fact, turn it around, by allowing goods to be produced at a higher quality for a lower price," explains Dr. Michael.

Near elimination of basic manufacturing would greatly reduce the domestic market for hi-tech goods, forcing hi-tech producers to look for markets abroad where they would meet tough foreign competition. Clearly, it is to the benefit of high-technology industries that the U.S. maintain a substantial manufacturing base to serve as a major market for hi-tech products.

Frederick Gander, Jr., a consultant with Arthur D. Little's Resource Consulting Group, points out that in the future capital goods will be more electronic-intensive than metal-intensive, but that metalworking industries will continue to be an important factor in the capital goods market. In fact, basic industries are already valuable customers of hi-tech goods. The auto industry alone has invested millions in new technologies. Ford has 400 computer-aided design (CAD) stations worldwide. The company says that it has produced more automotive body tooling using CAD-CAM technology than any other company in the world. General Motors Corp. expects it could be using 5,000 robots by 1985 and 14,000 by 1990.

Automotive industry needs have inspired many new technologies and the applications for them, from programmable controllers (PCs) to welding robots. "Unquestionably, applying the latest technology is crucial to our effort toward improving productivity—the next signpost in our thinking and planning for the future," says Mr. Caldwell.

The nation's auto industry is not only a major user of high technology, but also a developer of advanced technologies, for use both within the industry and as a separate, diversified part of its business. Interestingly, Ford was ranked second in the nation in total spending for R&D in 1981, and was first in R&D expenditures as a percent of sales, with much of the work in hi-tech areas. General Motors sees potential

Is a broom hi-tech?

"High technology is a dangerous term," says David Birch, an engineer who directs the program on neighborhood and regional research at the Massachusetts Institute of Technology (MIT). "It has no meaning to me. Talk to ten different people, and you'll get ten different definitions. By definition that means the term has no meaning."

Many people understand high technology to mean a clean manufacturing company that's based on research and development and that makes a high-valued product, usually electronic or bioengineered. That's too narrow a definition, says Mr. Birch and D. Bruce Merrifield, assistant secretary for productivity, technology, and innovation, U.S. Dept. of Commerce.

"I prefer to use the term advanced technology," says Mr. Merrifield. "High technology is just one small part of the big picture of systems analysis.

"High technology is a buzzword that doesn't mean a great deal. It isn't really useful to distinguish between high and medium and low tech."

If the definition above is too narrow, other definitions may be too broad.

The staff of the Michigan Technology Council (MTC), based in Ann Arbor, searched libraries but couldn't find a definition. Finally they came up with three alternative definitions, says G. William Ince, president, MTC:

—"the application of the most advanced knowledge to a production or distribution process";

—"the adaptation and use of old technologies in new ways or in new combinations based on new scientific findings";

—"elegance of design, simplicity of construction and application, reliability in use, and low expense in terms of the job performed." The last definition is by Dr. Eric Rabkin, professor at the University of Michigan.

"All those definitions are true of a broom," rejoins Mr. Birch. "A broom applies the most advanced knowledge of sweeping. It's designed very elegantly and performs its function beautifully."

"My concern is to stay away from the sexy word 'high,' " says Albert A. Bogdan, head of Michigan's office of economic development. Last year he served on Michigan's High Technology Task Force. "We almost got them to change their name," says Mr. Bogdan.

"Some people within the group made a strong argument that the name really should have been the Michigan Technology Development Corp. Technology is a continuum on which it's hard to separate high from low. High and low aside, we need technology to develop products and improve productivity." Like Mr. Merrifield, Mr. Bogdan emphasizes that managing existing technology is as important as finding new technologies.

"High-technology firms are labor-intensive rather than capital-intensive," says a staff study on high-technology firms prepared for the subcommittee on monetary and fiscal policy, Joint Economic Committee, U.S. Congress. "They employ a higher percentage of technicians, engineers, and scientists than other manufacturing companies. The industries are science-based in that they thrive on the application of advances in science to the marketplace in the form of new products and production methods. R&D inputs are much more important to the continued successful operation of high-technology firms than is the case for other manufacturing industries."

This definition could give the impression that high-tech firms employ mainly highly trained engineers. This is not so.

"Most of the jobs created by hi-tech firms," says Mr. Merrifield, "are not hi-tech at all. They're supportive. Some statistics show that the businesses we think of as hi-tech employ 10 pct highly trained, hi-tech personnel and 90 pct supportive people doing relatively low-tech work." Other statistics show that every hi-tech position generates six to ten supporting jobs.

What specific businesses do people call hi-tech? Some of the leading companies of North Carolina's Research Triangle do: telecommunications equipment, digital switching equipment and computer R&D; research on human health, environment, pharmaceuticals, biomedicine and synthetic fibers; and engineering services.

Other fields that have been classified as hi-tech: robots, computer-aided design and manufacturing, and automated systems; lasers and optics; semiconductors, computer-aided instruction, office machines, typewriters and photographic equipment; genetic engineering—using new strains of microorganisms for agriculture, human health and even such industrial uses as mining; composite and other new materials; and aerospace, including aircraft and complete guided missiles.

One way to define a hi-tech company is by how much money it spends R&D. Hi-tech companies spend 8 to 10 pct of gross sales on R&D, says the Michigan Technology Council.

Product lifetime might be a better guide.

"I would group businesses according to their product obsolescence rate," says Mr. Birch. "If a business requires a lot of innovation to succeed, there's a good chance it will succeed in the U.S. But if a business does something routine, there's a good chance that a machine, such as a computer or robot, or someone abroad will take over that job.

"High technology represents a very small segment of a very important sector of our economy that I call the high-thought-content sector or high-innovation sector. This larger sector includes medicine, law, pharmaceuticals, hospital management, printing, publishing, and architecture. Innovation occurs at a rapid rate. Computer software lasts 1½ years; a newspaper, one day. Architecture and engineering require continual upgrading. Federal Express and American Express are high-thought-content firms," says Mr. Birch.

"The basis of these high-thought-content companies is thinking. You need a cadre of very bright and well-trained people to create systems. Since brains are your chief resource, many of these companies are located near universities. That's why in Pennsylvania, Philadelphia is one place with relatively low unemployment; in Massachusetts, Boston; in Kentucky, Louisville; in Michigan, Kalamazoo; in Ohio, Columbus," points out Mr. Birch.

In the 1950s and 1960s the construction of the interstate highway system, says Mr. Birch, made possible suburban shopping malls and a host of such businesses as McDonalds. Similarly, advances in flexible microprocessors and genetic engineering could alter the American scene and spawn a host of supportive industries.

Bryan Berry

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not only in the increased use of automation in auto production, but also in developing and manufacturing such equipment for its own and other industries. The automotive giant joined forces with Japan's Fanuc Ltd. to form GMF Robotics Corp. The new company will design, manufacture, sell, distribute and service flexible manufacturing systems for a wide range of industrial customers.

General Electric Co., with a long history of technological innovation, is working to integrate high technology into some of its own operations, as well as into those of its customers. The company is investing $316 million in the most advanced equipment available to upgrade its aging Erie, Pa., locomotive factory. The shells of the buildings—some of which date back to the 1900s—will mask the latest in robots, programmable controls, computerized machine tools and other automation systems. GE expects the market for locomotives to revive, and they want to be ready with the newest, most cost-efficient technology when it does.

The enthusiasm generated for hi-tech is contagious, but most politicians and economists recognize the importance of a core of basic manufacturing to meet the nation's industrial and defense needs. The United States has long attached value to self-sufficiency. The consensus ends with that goal; the differences begin with how to achieve it.

Dr. Albertine believes that currently we are seeing a battle over limited resources, with hi-tech often winning. He says that economic recovery, along with lowered interest rates, will result in an easing of capital. And that will benefit all industries, including basic. The market forces at work.

Ira Magaziner, a Rhode Island-based industrial policy consultant, thinks the situation in basic industry has deteriorated too far for the marketplace to correct on its own. He suggests aid and incentives from the Government targeted for industry to build new, technologically state-of-the-art plants. "We have to become competitive in these industries," he says. "There's no reason why we have to abandon them," he adds.

Becoming competitive once again in our basic industries by using higher technology may not result in the rehiring of all those workers displaced during this recession; remaining uncompetitive, the experts say, surely will result in still more job losses and erosion of the nation's economic base.

Employment

The two extremes have hi-tech either stealing jobs from people or providing all jobs of the future. The truth lies somewhere in between.

Two schools of thought have emerged on the issue of high technology's effect on employment: those who think hi-tech only will eliminate jobs and take away opportunities to make a living vs. those who see hi-tech replacing basic industries as the great provider of jobs in this country. Both are distortions. To gain perspective, we should ask: How many jobs will hi-tech growth create; how many will it eliminate through advances in robotics, CAD-CAM, CIM, etc.; and how many workers will make the transition from old to new industries? Or, what's the net impact?

"People who say we can go to hi-tech heaven are dreaming. Put all the high-technology people together and it still equals only 10 pct of the number em-

(Cont. on p. 58)

Hi-tech will carve new jobs, but not enough for all those displaced from basic industry.

Who will catch the hi-tech bandwagon?

There's only limited space aboard the hi-tech express, but some areas already have a real leg up on the competition. They offer many of the key resources—labor force, quality of life, educational support—that spawned Silicon Valley, Route 128 and Research Triangle Park.

Florida, stung by the 1974 recession and its dependence on tourism and construction, is running very hard in the race to attract new, "clean" industries. The state already boasts a "Silicon Coast" from Miami to Palm Beach, represented by IBM, Harris Corp., Motorola and Racal-Milgo among others. To the north, it's the Space Coast and more electronics, and on the west coast of Florida, still more electronics and defense technology companies.

Maury Hagerman, of the state's Bureau of Economic Analysis, estimates Florida's high-tech companies directly contribute $2.7 billion annually in salaries and 25 pct of all manufacturing jobs in the state. Florida estimates the number of high-technology jobs there jumped from 55,000 in 1975 to 110,000 in 1981, double the number employed by similar North Carolina firms.

Florida Gov. Bob Graham wants the state to continue shining. In his 1983-85 budget recommendations, he proposes $85 million for enhancing math/science programs in schools and community colleges; $20 million for university engineering programs; plus $3 million for promotional programs to attract high-tech firms to the state.

It should come as little surprise that Texas, too, has its contenders. Austin began twenty years ago to reduce its dependence on the public sector (the state capital, state university and Federal government) by attracting private industry. With 50 pct of its land government-owned and generating no tax revenues, Austin needed to expand its tax base. High-tech firms, primarily semiconductor producers, are doing just that. Motorola and Data General have facilities; Lockheed Space and Missiles opens a facility shortly. The city is using its university-trained workforce, quality of life, and already-strong base of high-tech firms, not tax incentives, to attract still more.

Ed Brady of the city's Chamber of Commerce, emphasizes Austin wants to import jobs, not people. "We're looking for companies that want to expand, not those who will close up shop, move their people, and reopen here. So far, 90 pct of the new jobs created have been filled locally," says Mr. Brady.

From the looks of things, John Naisbitt's prediction in *Megatrends* of the coming three mega-states—California, Florida and Texas—may not be farfetched. But don't discount those Northern states so fast. In fact, a Congressional study on the location of high-tech firms found the Midwest leads the way among regions expected to win the lion's share of such new plants and offices.

Dayton, Ohio, is capitalizing on its resources in place—a large, highly trained work force of scientists and engineers, the Air Force research facility at Wright-Patterson AFB and a strong educational system—to develop and attract high-tech industries. Much of the growth is the result of commercial spinoffs from R&D projects at Wright-Patterson; the city is helping local entrepreneurs with startups.

"We're not trying to create an asset and build around it, as many cities are doing," says Tom Ferguson of the Dayton Development Council. "We're trying to sell those resources—human and natural—that we already have." A survey to explain the low (5 pct) annual turnover among its 20,000 scientists and engineers, pointed to the "challenge of the work" in Dayton, being on the leading edge of new technologies. Mr. Ferguson projects private hi-tech employment in Dayton to grow 30 pct annually for the next three years.

A number of other cities are making the high-tech pitch successfully, as well. Syracuse, N.Y., already employs a high percentage of it residents in high-tech jobs, including 7,000 by General Electric. The university's work in artificial intelligence and software computer applications is one magnet; medical technology companies, led by Bristol Laboratories, are attracted by the new state medical school.

Worcester, Mass., a former mill town, is attracting biotechnology firms to augment employment provided for years by Norton Co. and Wyman-Gordon. The state medical school, Clark University, and nearly a dozen other colleges and library support, plus community cooperation, are the "magnets critical to the development process of such industries, aside from the conventional tax incentives," says Dr. Abraham Haddad, chairman of the committee to develop a high-tech park in the city.

Cleveland is proposing a new research center for manufacturing technology, drawing on the resources and expertise of local universities and companies, including White Consolidated Industries, Warner & Swasey, Acme-Cleveland, TRW, General Electric, Reliance Electric and Republic Steel.

Albuquerque, N.M., Tucson, Ariz., and Colorado Springs, Colo., are new competition in the Southwest. In the East, northern New Jersey and Long Island are quietly attracting high-tech businesses who want the closeness of New York and its resources, without the problems.

Ted Levine, whose company Development Counsellors International, Ltd. specializes in providing support for economic development programs, cautions all the newcomers: "Don't put all your eggs, or even most of them, in the high-tech basket. It's a very small basket." He adds that areas with the greatest chance of success are those that carefully determine their in-place assets, conduct an exhaustive inventory of their work force and skills, and put an emphasis on home industries—developing and keeping them—not attracting new ones to build around.

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ployed by the auto industry," points out Mr. Magaziner.

"The problem in Michigan is if people think high technology is going to replace the auto industry as a major employer, they're off base. They are never going to be able to hire 250,000 laid-off auto workers in high technology," according to Shelby Solomon, policy advisor to Michigan's Gov. Blanchard. "We want to pursue hi-tech, but only as part of the strategy for improving the state's economic situation. It's not the solution to the whole problem," he adds.

"There's no way high technology and jobs can grow fast enough to offset those other job losses," says Dr. Chimerine.

Already we are seeing some exporting of high-technology production jobs. Atari sent shock waves with its decision to move 1,700 California assembly jobs to Asia. Apple Computer and Wang Laboratories already do preliminary assembly work in the Far East. Semiconductor producers, including Intel and National Semiconductor, went overseas a while ago for some of their operations. As the manufacturing of many hi-tech products is streamlined and fewer skills are required to make them, producers naturally will export the jobs to countries with lower labor costs. It is an evolutionary process that has affected all our industries from textiles to televisions. Not everyone sees it as negative.

"Our comparative advantage in this country is not in mindless work but is, in fact, in high-thought-content activities. Those that are not will be exported to countries with lower training rates and, therefore, lower wage rates," explains Dr. Albertine. "That good. It forces our people to move into activities where we do have a comparative advantage," he adds.

Dr. Michael sees the natural evolution as taking a twist in the not-so-distant future. "It will be different over the next 15 years, because computer technology is opening up completely new doors. The choice now is, 'Do I make it here manually vs. making it manually in Southeast Asia for much less?' Soon, there will be a choice for making it again here, with automation. Automation will be a new justification of keeping business here," predicts Dr. Michael. While automated factories might not mean a significant direct increase in jobs, keeping industry here results in more indirect jobs and a healthier economy.

He adds that the increase in factory automation might require more and different ways to measure economic size and growth. "In the past, there was a high correlation between labor and unit sales, but that's changing. The ratio of variable costs to fixed costs is decreasing. That means fewer people are needed to push out the same number of goods. We are not going to measure economic growth by numbers of employees, but by production or sales," explains Dr. Michael.

In a recent article in the Labor Department's *Monthly Labor Review*, Sar Levitan and Clifford Johnson discussed several theories on the potential effects of automation on work. They conclude that while some agree on how fast the changes might occur, there's no consensus as to what the results will be.

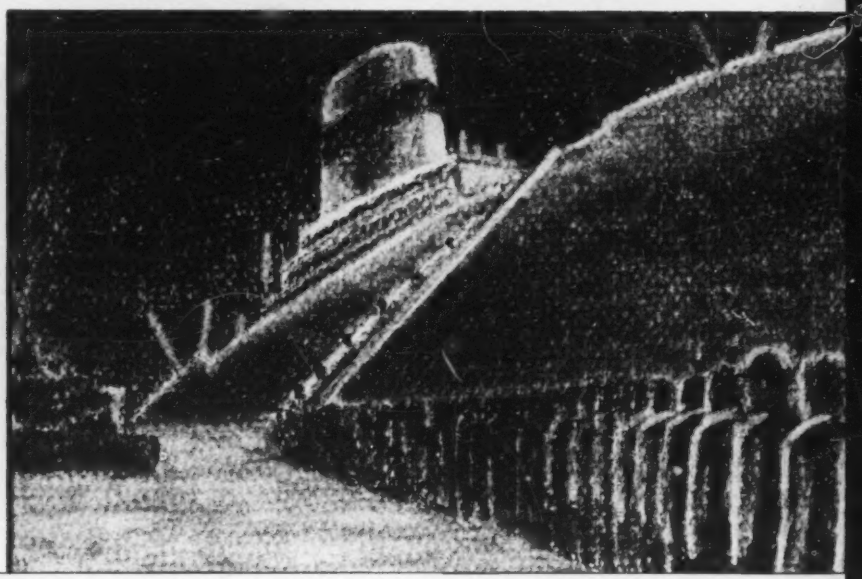
"There is general agreement that office technologies will be changing rapidly, but little indication of whether the result will be reduced office employment, shifts in future employment growth, or simply higher levels of productivity in white-collar settings," according to their findings. Most important, they conclude that while the potential for replacing large numbers of workers with automation is great and close at hand, it does "not reflect the rate at which new technology will actually be introduced to the workplace. . . . [P]redictions of immediate and massive job losses tend to ignore the market forces which slow the pace of technological change." They point out that many factors, including the size of required investment and the rate of capacity utilization, act to moderate the absorption of automated technologies.

Dr. Michael agrees that it will be a "long time" before the technology is coordinated enough to make the truly automated factory practical and inexpensive on a large scale. When that does happen, it's "going to be gradual enough so that there are no disruptive effects. The current plant closings due to lack of business are much more disruptive" to the labor force than the effect of automation is expected to be, according to Dr. Michael.

Last year, a Congressional Budget Office study sounded the alarm: ". . . [A]utomation could eliminate 200,000 manufacturing jobs in the automobile industry by 1985. . . . [P]roductivity improvements will reduce the workforce of integrated steel producers by 2 or 3 pct each year through 1990. . . . [I]ndustrial robots could eliminate one to three million jobs in the near future and possibly up to seven million by the year 2000."

The study does not try to predict how the workforce will be structured 20 years from now; rather, it asks what

Export of hi-tech jobs is expected now that production is simplified, requiring few skills.



those workers displaced by the changes will do during the transition and how the government can help.

Bennett Harrison's New England study, Labor Department studies and others confirm that displaced skilled workers are not being reabsorbed into new high-growth industries. The reasons are many and varied. Many of today's industrial workers have specific skills not easily transferred to other jobs. Many have inadequate job-market information, leading either to unrealistic job aspirations or ignorance about job opportunities. Displaced workers often are reluctant to relocate, for financial and non-financial reasons. The newer jobs can mean a reduction in pay because of loss of seniority and lower levels of unionization.

Furthermore, the Congressional Budget Office study projects a mismatch may be developing between the demand for work and the supply of jobs.

"Engineers and computer personnel, for example, as well as other white-collar workers should enjoy ample opportunities for work. . . . At the same time, however, workers from traditional manufacturing industries—usually blue-collar workers—already predominate among the displaced, and most do not have the skills to fill available jobs in the growth industries," according to the study.

Bennett Harrison found that in New England, very few workers—young and old—who left the mill industries after 1958, found work in the high technology industries in the region. Nearly three-quarters of the 833,000 people working in the mills in 1958 left. "By 1975, only 18,000 of them—fewer than 3 pct—were employed in the high-tech industries of the region. (Another 2,000 had migrated to high-tech jobs outside of New England.) Most went into the service sector . . . , dropped out of the labor force, or had no job at all. Only an eighth of the group had retired by 1975," according to the study.

Of the 131,000 who were under twenty-five in 1958 and subsequently left the mills, only 5,000 were working in the region's hi-tech industries in 1975. The MIT professor found that hi-tech companies in New England hire young, inexperienced people out of school and the home, and recruit the more experienced workers form each other.

Dr. Harrison sees a widening gap developing, a polarization of job requirements, contradicting theories that technical changes eliminate mainly jobs for the unskilled: ". . . [T]here is evidence that the rationalization of the labor process tends disproportionately to eliminate jobs falling into the middle of the earnings distribution, between those requiring little or no skill . . . and those given over to supervision and management."

In their study of the educational implications of high technology, Henry M. Levin and Russell Rumberger, of Stanford Univerity's Institute for Research on Educational Finance and Governance, found that the total number of new jobs generated by high technology from 1978-1990 will be "vastly outweighed by employment growth in other areas." Surprised?

The study shows that of the 20 occupations expected to generate the most growth in this period, not one is related to high technology. "The five occupations expected to produce the most new jobs are all in low-skilled areas: janitors, nurses' aides, sales clerks, cashiers, and waiters and waitresses." They predict employment growth for the economy as a whole will favor low and middle-level occupations. If that forecast holds true, what skills and education will industry require from its workers?

Education

Politicians press for more math/science education, but forecasts show low-skill jobs will be in greatest supply.

Cries from hi-tech industries about employee shortages and concern about foreign competitors catching up have sparked a kind of "Sputnik" response from industry, educators and politicians.

They are demanding programs for more math and science in the schools, funding to retrain workers, and other plans for attacking the problem. Congress proposed the Emergency Mathematics and Science Education Bill to offer $325 million in block grants to schools and colleges to improve programs geared toward high technology.

But it is not clear if workers of the future will need substantially more or different skills; second, assuming they need more skills, if we are targeting the appropriate ones; and third, if the programs will do anything about the problems industry and workers face *today*?

The Levin-Rumberger study concluded that most new jobs will *not* require new and different skills. "Indeed,

one of the major purposes and effects of high technology is to simplify or reduce the skill requirements for performing a particular work task. With the exception of a relatively small number of highly specialized positions for designing and implementing high-technology applications, most jobs will not require higher skills levels. . . . [T]he preponderance of persons affected by such shifts will not need more mathematics or computer science," they concluded.

In fact, as new technologies are refined, their ease of application increases. Today's operator of a computer numerically controlled lathe can be taught to produce a part much more quickly than could his counterpart of 30 years ago, even though the equipment today is much more sophisticated.

Some analysts expect there will be great demand for skilled technicians to service all the complicated automated equipment that will be in our factories. But we are well beyond the age where one had to understand how a car worked to drive and repair it. Service technicians today already run diagnostics on a piece of equipment and let the computer tell them where the problem is. Modular design makes repair fast and simple. The point is, we won't need trained engineers to do that kind of work.

Nonetheless, few will dispute the importance of having a well-educated population whatever the specific requirements of industry might be. "There's a danger if you don't have an educated population. . . . One thing we've learned is that by making educational opportunities broadly based, we all benefit because we don't know in advance who the bright lights are," offers Dr. Berg of Carnegie-Mellon.

Dr. Michael argues that less differentiation of labor means fewer specific or detailed skills needed, but that society will require more computer literacy and the ability to think logically.

Dr. Laurence Berlowitz, provost, Clark University, says there is a continuing pressing need for design engineers with a whole range of skills. He adds, "In general, the main problems are that we don't have the basic skills: writing, reading and conceptual skills."

Those in higher education complain they can't compete with private industry salaries to attract top engineers to the field of teaching or hold onto the ones they have. The result may be a shortage of highly trained and educated people to become the technological innovators of tomorrow, not a lack of programmers and technicians who can be trained on the job.

Outlook

American industry—basic and hi-tech—will have to adjust to stay competitive.

High technology will mean changes in all industries, adjustments in our thinking as managers and individuals. Some believe the demographics pointing to smaller numbers entering the job force in the 1990s are in our favor. Michael Wachter, professor at University of Pennsylvania's Wharton School, calculates that the aging of the baby boom generation and the abundant supply of experienced workers will push us into a highly skilled economy; we simply won't have the younger workers to fill the lower-skilled jobs.

The flip side, of course, is that the abundance of job opportunities on the lower end, combined with stiff competition for the better jobs, could force older, experienced workers to take low-skill jobs. We also may have to adjust upward the acceptable level of unemployment in this country.

Individual stockholders and managers may have to shift to more long-term expectations. Companies simply are going to have to invest more money into high technology—whether they're developing it or buying it—and that will mean reduced short-term returns for investors. Venture capitalists, demanding three-to-five year payback, may sour on hi-tech as it requires constant infusions of capital into R&D to stay competitive.

"U.S. investment in research and development is nowhere near as much as our competitors'. We're taking short-term investments, not the risky investments that may not pay off for a long time," laments Ira Magaziner. "If we continue this way, we're going to be in trouble in five years," he adds.

Government also may have to adjust regulations on everything from imports to cooperation among industry competitors, as an accommodation to the change in all industries brought on by high technology.

In its efforts to maintain fair business practices, the Government has enacted laws to provide for free trade and competition for U.S. goods and services sold here and to foreign buyers. The result is an unrestricted flow of goods into the country and a restricted flow of information between U.S. companies in the same industry.

Some policy analysts believe that we will have to institute a limited form of trade protection to spur our basic industries and to maintain the margins of our hi-tech industries. They point out such protection has only helped, not hurt, our European and Japanese competitors.

Many in the newer industries support an easing of antitrust laws to permit companies to pool resources in early stages of research and development. Others say industry must increase its ties with university research and look for more commercial applications based on basic research findings.

Already such academic heavyweights as Stanford and MIT are beneficiaries of funding for microelectronics research centers from such industry leaders as General Electric, Hewlett-Packard, IBM, Intel and United Technologies. Westinghouse Electric is working with Carnegie-Mellon's Robotics Institute to develop robots for industrial use. California, Arizona, Minnesota and North Carolina state governments all have appropriated funds for industry-university programs in high technology.

The real burden of keeping one step ahead in high technology will fall to the managers. They will have to initiate the long-term spending on R&D, the long-term investments in advanced capital equipment, the joint company-company or industry-university research partnerships. Dr. Berlowitz of Clark University hopes managers in industries producing and using high technologies will be up to the task.

"We need more training of managers for high-technology industries. We need managers with more technical knowledge. Top-line management is not always knowledgeable of what's going on in research, so it's not easy for them to react quickly to change and take advantage of new technologies and assimilate them into the corporate structure," says Dr. Berlowitz.

The growth potential of hi-tech *manufacturing* industries is relatively small compared to the last peak of auto and steel manufacture. Experts agree the real potential of high technology is in the impact of its implementation, the changes it will bring to all our industries—manufacturing and services—to make them more productive and more competitive. □

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EFFECTIVE MARCH 28, 1983

MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective March 28, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,651	1,585	17,133	21,268
Capability Utilization Rate	57.0	54.7	48.7	59.5

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.195
Pig Iron** (Net ton= 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 72.83	$ 72.83	$ 73.83	$ 78.83
No. 2 bundles	$ 51.83	$ 51.83	$ 51.83	$ 51.83
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh .	$ 77.50	$ 77.50	$ 80.50	$ 86.50
No. 1 steel, Philadelphia	63.50	63.50	63.50	75.50
No. 1 steel, Chicago.....	77.50	77.50	77.50	74.50
No. 1 bundles, Detroit..	76.50	76.50	76.50	73.50
Low Phos., Youngstown	69.50	69.50	69.50	90.50
No. 1 mach'y cast., Pgh	79.50	79.50	79.50	86.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	113.50
No. 1 mach'y cast., Chi..	112.50	112.50	112.50	124.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective March 28, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	77.00-78.00	76.00-78.00	3/25/83
Lead	20.50-23.00	20.00-23.00	3/10/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00-40.00	40.00	3/1/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas .$2.00
Beryllium-aluminum 5% Be, per lb. contained Be.....$201.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200.....$166.00
Bismuth, ton lots .....$1.55-$1.60
Cadmium, under one ton .....$1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode.....$12.50
Gold per troy oz. $408.75
Indium, dollars per troy oz.....$3.10
Iridium, dollars per troy oz.....$600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$325-$345
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz.....$475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz.....$10.335
Vanadium $4.94
Zirconium sponge.....$12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Mar. 21—602.26 Mar. 24—602.70
Mar. 22—602.70 Mar. 25—602.03
Mar. 23—601.73

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	73½	64¼
Yellow brass	62¼	61¼
Red brass	67½	66⅛
Comm. bronze	69	67¾
Mang. bronze	61	59⅛
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	68
No. 2 copper wire	58
Light copper	49

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	64
No. 2 copper wire	54
Light copper	45
No. 1 composition	53
No. 1 comp. turnings	49
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	27
Radiators	43

Aluminum

New mixed clips	34	—35
Old sheet	32	—33
Old cast	32	—33
Clean dry borings	33	—34

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	27	—28
Mixed L.C. clips	24	—25
Old sheets and cast	19	—20
Borings and turnings	13	—14
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	58	—59
No. 2 copper wire	51	—52
Light copper	44	—45
Radiators	37	—38
No. 1 composition	46	—47
No. 1 composition turn'gs	42	—44
Cocks and faucets	32	—33
Clean heavy yellow brass	31	—32
Brass Pipe	31	—32
New soft brass clippings	46	—47

Lead

Heavy soft lead	10	—11
Whole batteries	4	— 5
Type metal	15	—16
Electrotype	17	—18

Nickel

Nickel solids	95	—100
Nickel rod ends	95	—100
Nickel sheets, clips	95	—100
Nickel turnings	45	— 50

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

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EFFECTIVE MARCH 28, 1983

MATERIALS NEWSFRONT

(Effective March 28, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 77.00 to	$ 78.00
No. 2 hvy. melting	67.00 to	68.00
No. 1 dealer bundles	85.00 to	86.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 bundles	54.00 to	55.00
No. 1 busheling	85.00 to	86.00
Machine shop turn.	9.00 to	10.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	30.00 to	31.00
Low phos. punchings plate	91.00 to	92.00
Heavy turnings	67.00 to	68.00
No. 1 RR hvy. melting	85.00 to	86.00
Rails 2 ft. and under	96.00 to	97.00
Scrap rails, random lgth.	88.00 to	89.00
RR specialties	93.00 to	94.00
No. 1 machinery cast	79.00 to	80.00
Cupola cast	72.00 to	73.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	565.00 to	575.00
18-8 turnings	465.00 to	475.00

Chicago

No. 1 hvy. melting	$ 77.00 to	$ 78.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	87.00 to	88.00
No. 1 factory bundles (auto)	91.00 to	92.00
No. 2 dealer bundles	54.00 to	55.00
No. 1 busheling	84.00 to	85.00
Shredder scrap	80.00 to	81.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	41.00 to	42.00
Low phos. forge crop	92.00 to	93.00
Low phos. punchings plate 1/4 in. and heavier	98.00 to	99.00
Low phos. 2 ft. and under	92.00 to	93.00
No. 1 RR hvy. melting	84.00 to	85.00
Scrap rails, random lgth.	76.00 to	77.00
Reroller rails	101.00 to	102.00
Rails, 2 ft. and under	97.00 to	98.00
RR couplers and knuckles	86.00 to	87.00
RR car axles	109.00 to	110.00
No. 1 machinery cast	112.00 to	113.00
Cupola cast	97.00 to	98.00
Stove plate	94.00 to	95.00
Steel car wheels	86.00 to	87.00
Stainless		
18-8 bundles and solids	515.00 to	525.00
18-8 turnings	415.00 to	425.00
430 bundles and solids	130.00 to	135.00
430 turnings	95.00 to	100.00

Philadelphia

No. 1 hvy. melting	$ 62.00 to	$ 65.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	79.00 to	82.00
No. 2 dealer bundles	45.00 to	48.00
No. 1 busheling	79.00 to	82.00
Shredder scrap	77.00 to	80.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	40.00 to	43.00
Low phos. 5 ft. and under	79.00 to	82.00
Low phos. 2 ft. punchings	91.00 to	94.00
Electric furnace bundles	95.00 to	98.00
RR specialties	79.00 to	82.00
Rails, 2 ft. and under	93.00 to	96.00
Cupola cast	60.00 to	63.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:		
No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	76.00 to	77.00
No. 2 bundles	32.00 to	33.00
No. 1 busheling	73.00 to	74.00
Drop forge flashings	47.00 to	48.00
Machine shop turn.	29.00 to	30.00
Mixed borings and turn.	14.00 to	15.00
Shoveling turnings	29.00 to	30.00
Cast iron borings	13.00 to	14.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	69.00 to	70.00
Stainless		
18-8 bundles and solids	470.00 to	480.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	120.00 to	130.00

Youngstown

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	79.00 to	80.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	69.00 to	70.00
Electric furnace bundles	75.00 to	76.00
Galvanized bundles	65.00 to	66.00

Cleveland

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	77.00 to	78.00
No. 1 factory bundles	86.00 to	87.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	77.00 to	78.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	95.00 to	96.00
Low phos. punchings plate	95.00 to	96.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	99.00 to	100.00
Rails, 18 in. and under	100.00 to	101.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	89.00 to	90.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	275.00 to	285.00
18-8 turnings	225.00 to	235.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 busheling	38.00 to	39.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.	9.00 to	10.00
Mixed bor. and turn.	16.00 to	17.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	15.00 to	16.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	50.00 to	51.00
Scrap rails, random lgth.	30.00 to	31.00
No. 1 machinery cast	71.00 to	72.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	53.00 to	54.00
Foundry steel, 2 ft.	53.00 to	54.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	50.00 to	51.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	64.00 to	65.00
Rails, random length	61.00 to	62.00
Rails, 18 in. and under	76.00 to	77.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	82.00 to	83.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	96.00 to	97.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 58.00 to	$ 59.00
No. 2 heavy melting	56.00 to	57.00
No. 1 dealer bundles	58.00 to	59.00
No. 2 bundles	43.00 to	44.00
No. 1 busheling	58.00 to	59.00
Shredder scrap	74.00 to	75.00
Machine shop. turn.	21.00 to	22.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	31.00 to	32.00
Electric furnace bundles	58.00 to	59.00
Elec. furnace, 3 ft. & under	56.00 to	57.00
Structural and plate, 2 ft.	79.00 to	80.00
Structural and plate, 4 ft.	71.00 to	72.00
No. 1 RR hvy. melting	59.00 to	60.00
Scrap rails, random lgth.	60.00 to	61.00
Rails, 18 in. and under	79.00 to	80.00
Angles and splice bars	73.00 to	74.00
No. 1 cupola cast	77.00 to	78.00
Unstripped motor blocks	52.00 to	53.00

Cincinnati

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 dealer bundles	59.00 to	60.00
No. 2 bundles	30.00 to	31.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	11.00 to	12.00
Low phos. 18 in. and under	78.00 to	79.00
Rails, random length	60.00 to	61.00
Rails, 2 ft. and under	82.00 to	83.00
No. 1 cupola cast	65.00 to	66.00
Heavy breakable cast	29.00 to	30.00
Drop broken cast	69.00 to	70.00

New York

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	455.00 to	475.00
18-8 turnings	340.00 to	365.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	40.00 to	42.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	40.00 to	42.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	33.00 to	35.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 dealer bundles	12.00 to	14.00
Machine shop turn.	4.00 to	6.00
Cast iron borings	4.00 to	6.00
No. 1 cupola cast	83.00 to	85.00

Los Angeles

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	29.00 to	31.00
No. 1 dealer bundles	27.00 to	29.00
No. 2 dealer bundles	9.00 to	11.00
Machine shop turn.	4.00 to	6.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	4.00 to	6.00
Elec. furnace, 1 ft. and under (foundry)	84.00 to	86.00
No. 1 cupola cast	86.00 to	88.00

Seattle

No. 1 hvy. melting	$ 58.00 to	$ 60.00
No. 2 hvy. melting	47.00 to	49.00
No. 2 bundles	36.00 to	38.00
No. 1 cupola cast	92.00 to	94.00
Mixed yard cast	79.00 to	81.00

Hamilton, Ont.

Brokers buying price per net ton on cars:	
No. 1 heavy melting	$ 55.00
No. 2 heavy melting cut 2 ft. and under	52.00
No. 1 dealer bundles	60.00
No. 2 bundles	30.00
Mixed steel scrap	34.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	25.00
Short steel turn.	28.00
Mixed bor. and turn.	15.00
Cast scrap	48.00

Houston

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	49.00 to	50.00
No. 2 bundles	34.00 to	36.00
Machine shop turn.	18.00 to	19.00
Crushed turnings	33.00 to	35.00
Shredder scrap	64.00 to	65.00
Cut structural plate 2 ft. and under	84.00 to	86.00
Unstripped motor blocks	60.00 to	62.00
Cupola cast	69.00 to	71.00

METALWORKING ORDER TRENDS

Orders slippage is no worry; blame it on the Pentagon

After three straight months of gains in new orders for durable goods, February turned out to be a clunker.

These orders in February fell by 3.1 pct from the pace set in the opening month of the year. In dollars, the decline was from $80.9 billion to $78.4 billion.

It is not likely the February decline marks the end of a longer term upswing. For one, just about all of the February dip was centered in the very volatile defense industry capital goods sector. These orders totaled $6.1 billion in February, down sharply from January's $8.9 billion volume.

Too, it could hardly be expected that the hot pace of January would continue through February. Orders in January had jumped by about 6 pct.

Taking a bit longer view, it is reassuring that the orders' dollar volume in February was 13 pct above the October 1982 starting point of the recent climb.

Despite the orders softness in February, it seems there are few economists or business executives who view that one-month showing as meaning business recovery hasn't come or won't come.

On the other hand, not many seem to think the recovery in durable goods new orders—especially, capital goods orders—is going to be a strong one. At least, not for some time yet. Near-record high real long-term interest rates remain a block to any strong recovery in orders.

Corporations are using much of the money they earn or borrow at this time to rebuild their recession-torn balance sheets.

That means any strong step-up in buying plans for the big-ticket items will have to wait.

For the six major metalworking industry groups shown on the table here—primary metals, electrical and nonelectrical machinery, transportation equipment, fabricated metal products and instruments—orders, at $66.2 billion in February, were off 2.9 pct from January.

But it was a mixed-bag showing. Primary metals has a good month for orders, up from $8.2 billion to $9.6 billion. Also, fabricated metal products were up almost 4.5 pct to $9.6 billion.

Instruments managed to hold their own as orders weakness hit in the machinery and transportation equipment industries.

Source: U.S. Dept. of Commerce Billions of dollars, seasonally adjusted monthly total, unless otherwise noted		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
Capital Expenditures (Annual Rates)				
U.S. Industry, Total	1st Qtr.	$316.4*	$315.2	$327.7
Manufacturing, Total	1st Qtr.	121.4*	120.5	128.5
Manufacturing, Durable Goods	1st Qtr.	57.9*	55.8	60.8
Mining Industry	1st Qtr.	16.2*	15.6	17.6
Key Indicators, Durable Goods Manufacturing				
New Orders	Feb.	78.4	80.9	76.4
Shipments	Feb.	77.4	77.3	79.8
Inventories	Feb.	173.5	174.0	184.5
Unfilled Orders	Feb.	289.7	288.8	308.7
New Orders, Metalworking				
Capital Goods Producers, Nondefense Industries	Feb.	25.1	29.3	20.5
Capital Goods Producers, Defense Industries	Feb.	6.1	8.9	8.7
Primary Metals, Total	Feb.	9.8	8.2	8.6
Steel (SIC 331)	Feb.	4.1	3.4	4.0
Iron & Steel Castings (SIC 332)	Feb.	0.8	0.8	0.8
Nonferrous Metals	Feb.	4.9	4.0	3.8
Nonelectrical Mach.-Equip. Industries, Total	Feb.	12.5	13.3	14.6
Engines & Turbines	Feb.	1.0	1.0	1.4
Farm Machinery & Equipment (Shipments)	Feb.	0.8	0.9	1.0
Construction, Mining & Materials Hdlg. Equip.	Feb.	1.8	1.8	2.9
General Industrial Machinery	Feb.	1.2	1.1	1.3
Fluid Power Equipment** (Index-1972=100)	Feb.	198	207	237
Metalworking Machinery	Feb.	0.6	0.6	0.7
Machine Tools, Total (Millions $, unadjusted)***	Feb.	98.0	91.9	163.8
Machine Tools, Metal-Cutting***	Feb.	77.9	57.1	123.2
Machine Tools, Metal-Forming***	Feb.	20.1	34.8	40.6
Electrical Mach. & Equip. Industries, Total	Feb.	12.2	12.0	11.3
Elec. Transmission Equip. & Industrial Apparatus	Feb.	1.7	1.4	1.6
Household Appliances	Feb.	1.1	1.3	0.9
Communication Equipment	Feb.	4.2	3.9	3.6
Transportation Equip. Industrial, Total	Feb.	18.1	21.5	19.1
Motor Vehicles & Parts (Shipments)	Feb.	11.3	10.3	10.0
Aircraft, Missiles & Parts	Feb.	5.6	8.5	7.2
Shipbuilding & Military Tanks	Feb.	0.4	1.9	1.4
Fabricated Metal Products, Total	Feb.	9.6	9.2	9.6
Instruments, Total	Feb.	4.0	4.0	4.3

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA.

NOTE

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IRON AGE

THE MAGAZINE OF METALWORKING MANAGEMENT

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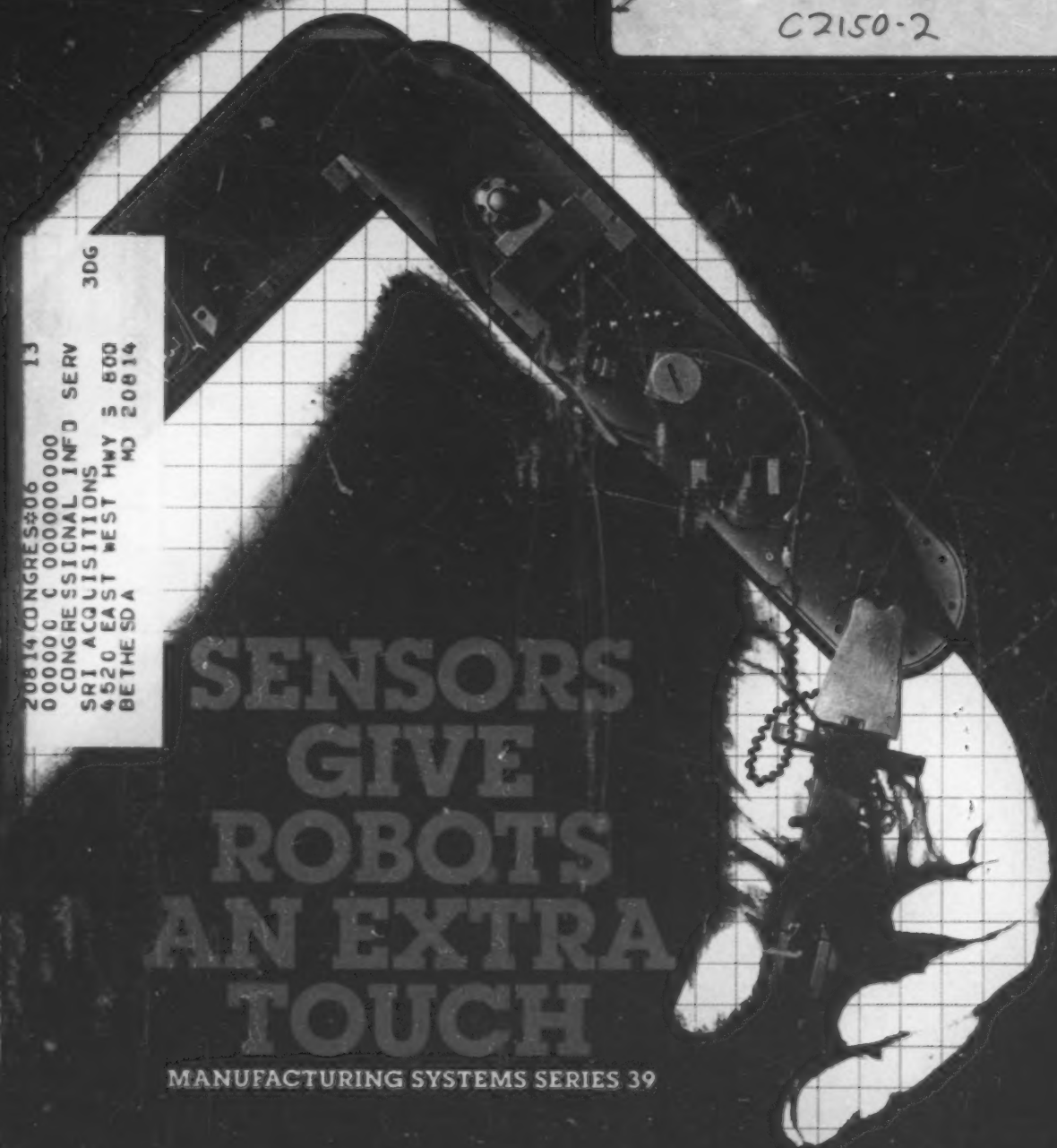

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MANUFACTURING SYSTEMS SERIES 39

VOL. 226, NO. 12

IRON AGE

APRIL 22, 1983

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Robot arm courtesy of International Robomation/Intelligence

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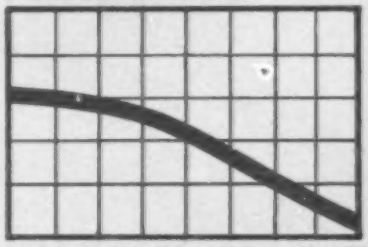

Annual steel financial analysis.

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DEFENSE BUDGET IS UNDER SIEGE

President Reagan's plans for a 10 pct increase in defense spending faces stiff opposition in the Congress and the business community.

BY EDWIN W. BOWERS

This year is a bellwether for several major military projects. For many of these, 1983 is the year that, once they are started, it will be impossible to stop them.

That and other aspects of the Reagan Administration defense budget for Fiscal Year 1984, and beyond, translate into a lot of work—about $94 billion worth—for metalworking and related industries. Overall, the President is proposing spending of $283.6 billion for defense next year, 10 pct more than last.

As a controversial topic, defense spending has once again come to the fore, and the President is throwing the challenge to those who would pare it back. Anyone proposing cuts, he says, should be made to say what part he or she would eliminate.

"Approaching this subject with a meat ax is no way to do it," says Rep. Barry Goldwater (R., Ariz.). "Just to come out and say we are going to cut 7, 8 or 15 pct from the military budget without specifying exactly where is not the approach."

Some influential people and organizations are calling for defense spending cuts, but, as anticipated by the President, they are, indeed, not being specific.

A coalition of three major business groups has called for between $18 billion and $23 billion in defense budget cuts. The trio consists of the National Association of Manufacturers (NAM), American Business Conference and National Federation of Independent Business. They say about $5 billion could be saved by cancelling or postponing purchasing new weapons.

NAM President Bernard O'Keefe said the Pentagon wants too many weapons systems that are expensive. For example, he said, the country doesn't need and can't afford the MX missile.

"Why not cut 5 pct from the defense budget?" Chrysler Corp. Chairman Lee Iacocca asks rhetorically. "A five pct cut would save $15 billion."

"I think we can automatically cut the budget by spending wisely," says Donald Greenbury, president of Arrowsmith Tool & Die, Southfield, Mich. He is also president of the National Tooling and Machining Association.

Mr. Greenbury and his association part company with the other three business groups that are opposing the increased defense outlays. "We are not for cutting defense spending," he says. "We support the President's method, increasing it slowly and methodically."

The White House has proposed a succession of increases for Fiscal Years 1984 through 1988. The Administration's plan would increase real, inflation adjusted, budget authority for defense spending by about 6.9 pct annually for those years.

Defense spending clearly influences some sectors of the economy more than others. More than 10 pct of the output in the aerospace, ordnance, shipbuilding and electrical equipment industries is the result of defense spending. The Congressional Budget Office says that under the Reagan plan, after adjustment for inflation, median annual growth for calendar years 1983 to 1985 could be 7.5 pct in the 100 small industries most involved in defense production.

Interestingly, while spending is up and the total number of specific weapons will be increased, the President has scaled down number of units from last year's long-range budget proposal. "Since we took office," says Defense Secretary Caspar Weinberger, more than 100 marginal weapons or equipment programs have been eliminated, reduced or merged."

The White House is calling for 702 additional aircraft in Fiscal '84, but this is 93 fewer than originally proposed. The President has cut back by 360 the number of M-1 tanks to be built this year. The current shipbuilding plan for 1984 proposes four fewer ships for new construction than were proposed in last year's plan. The budget for shipbuilding and conversion has been reduced to

$12.7 billion in Fiscal '84 from $16.2 billion the previous year.

"We expect that to stay pretty stable," says Edwin Hood, president of the Shipbuilders' Council of America. "This is because basically we're talking about jobs and the emphasis by the Administration at this moment is on jobs."

Rep. Jack Edwards (R., Ala.) points out that much of the funding in the Fiscal '84 budget relates to long-term projects, spanning the '83 procurement and going beyond 1984. "Thirty-five pct of that outlay budget comes from prior year appropriations," he points out.

"So," he adds, "if we are going to make any cuts in that area, what we would be doing would be reversing decisions made in prior years having to do with major weapons systems." This would include cutting out two aircraft carriers and the procurement money for the B-1 bomber voted last year.

"Having started in motion the procurement of systems that we need so desperately in this country," he says, "I think the Congress clearly would want to think a long time before it now reverses itself and moves in other directions."

Over the next five years, the White House is calling for spending about $663 billion for weapons, most of the amount for fewer than 50 high cost items.

Litton Industries, the nation's 15th largest defense contractor, says the issue of defense spending must be viewed in the larger context. Rudolph Lang, vice president of the company's defense electronics group, says, "If we must weigh the importance of defense spending, we need to recognize its inter-relationship with other Federal programs and the total budget." He argues that "defense is not an isolated issue. This country needs both a strong defense and a strong economy, both as deterrents to outside interference in U.S. affairs."

In the initial defense budget battle on Capitol Hill, the House of Representatives voted not to increase defense spending by the 10 pct President Reagan has proposed. The legislators instead voted a 4 pct hike over Fiscal '83 spending. The President militantly insisted that the 10 pct increase he wanted was inviolate and that cutting it would put the nation in dire peril. He hoped at that time to find greater support in the Republican-dominated Senate.

In early April, Mr. Reagan met with Republican members of the Senate Budget Committee and clung stubbornly to his call for a 10 pct increase in defense spending.

But it appeared that support from his own party is severely lacking. Following the meeting Sen. Lawton Chiles (R., Fla.) said, "I think we're going to have to force compromises if the President is going to stay locked in on the numbers. The Congress is going to have to work its will."

Top Defense Contractors Last Year
(millions of dollars)

	FY 1982
General Dynamics	5,891
McDonnell Douglas	5,630
United Technologies	4,208
General Electric	3,654
Lockheed Corp.	3,499
Boeing Co.	3,239
Hughes Aircraft	3,141
Rockwell International	2,691
Raytheon	2,262
Martin Marietta	2,008
Grumman Corp.	1,900
Northrop Corp.	1,596
Westinghouse Electric	1,492
FMC Corp.	1,371
Litton Industries	1,317

In the Senate, thus far, the President has fared no better than he did in the House. First, the Senate Budget Committee, by a vote of 19-2, rejected the President's military budget. Then, by a vote of 17-4, the committee approved a 5 pct increase in defense spending, half of what the President wanted.

Subsequent to the Senate actions, Mr. Reagan sent word to Capitol Hill that he would be willing to compromise. This angered several GOP members of the committee. If Mr. Reagan had come down from the 10 pct increase he clung so strenuously to earlier, they could have voted for the lesser figure and been seen as voting with the President instead of against him. Eight Republicans voted for the 5 pct hike including Committee Chairman Pete Domenici of New Mexico.

Mr. Reagan was asking for defense spending in the $280 billion range; the Senate Budget Committee voted for a $267 billion outlay. The committee did not say how the Defense Department should accommodate the shortfall.

Economists and legislators opposing the defense budget contend that the nation is in for a heavy tax burden if the White House proposals pass as designed. "If you insist on this level of defense spending you will have to have a tax increase of between $50 billion to $100 billion by 1988," says Brookings Institution economist Joseph A. Pechman.

According to a Brookings study, the current budget "not only has failed to reduce Federal spending, it has substantially increased it."

Mr. Pechman says the pace of the increases in expenditures on national defense, the significant reductions in non-defense spending and the size and form of the tax reductions fashioned by Congress are "fiscally inconsistent."

That position is strongly supported by a potentially powerful coalition of 500 top U.S. business leaders. They have come out strongly against the proposed defense spending and are calling for $25 billion in cuts. Reversing President Reagan's argument that those who want to cut should be more specific, the executives assert: "In this time of severe fiscal strain, the Administration has a duty to justify massive defense programs."

Deficits of the size the Reagan Administration is talking about, says Cincinnati Milacron CEO James A. D. Geier, would abort economic recovery and render any steady expansion in our defense capability politically as well as economically unsustainable.

"Military strength is not possible without enduring economic strength," says Scovill CEO William F. Andrews. "And neither of those can be main-

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Where Most of the Defense Money Would Go—Fiscal Year 1984

The proposed Fiscal Year 1984 procurement budget is $94.087 billion, an increase of $13.376 billion, or 16.6 pct over the $80.711 billion made available to date in Fiscal Year 1983. The increase for procurement again represents the largest dollar increase of any category in the new defense budget.

The following is a breakdown of new weapons proposed for each service branch:

ARMY—The Army consumes 20.4 pct of the Fiscal '84 procurement budget. Aircraft funding comes to $3.472 billion covering 206 vehicles including: 12 EH-60A Quick-fix helicopters, 112 AH-64 attack helicopters and 84 UH-60A Blackhawk helicopters.

Missiles—95 Pershing II missiles, 525 Patriot air defense missiles, 1,508 Stingers, 5,351 Laser Hellfire air-to-surface and 18,000 TOW antitank missiles.

The budget for weapons and tracked combat vehicles covers more than 3,000 tracked combat vehicles, 720 M-1 tanks and 600 Bradley fighting vehicles.

NAVY—The aircraft procurement budget is $11.127 billion. The total number of aircraft programmed is 281. This includes 6 A-SE and 6 EA-6B aircraft, 84 F-18 fighters, 24 F-14s, 11 CH-53E heavy lift helicopters, 21 SH-60B Seahawk copters, 5 P-3C Orion aircraft, 6 E-2C Hawkeye planes, 8 C-2 COD aircraft, and 38 T-34C trainers and 52 Trident missiles.

Shipbuilding and Conversion—The amount asked for is $12.698 billion. Covering a total of 32 ships including a Trident submarine, 3 SSN-688 attack submarines, 3 AEGIS cruisers, 1 LSD-41 landing ship, 1 LHD-1 amphibious assault ship, 4 minesweepers, 3 P-AO oilers, 9 strategic sealift vessels, 1 T-A hospital ship and 4 T-AKRX logistics ships.

AIR FORCE—This branch takes up the largest portion of the procurement budget, or $38.904 billion. It is hoped this will cover 312 aircraft including 10 B-1 bombers, 48 F-15s, 120 F-16s, 8 KC-10 tankers, 2 MC-130 planes, and 4 C-5B cargo planes.

Missiles—120 Cruise, 1,005 Sparrows, 1,700 Sidewinders, 2,600 Mavericks and 285 HARM missiles.

MARINE CORPS—A 7 pct decrease requested compared with FY '83—$1.852 billion. The funds will include 32 AV-8B B/STOL aircraft, 153 LVT-7 amphibious assault vessels, 113 light armored vehicles, 4[illegible] Hawk missiles, 706 Stingers and 2,200 TOW missiles.

tained if the Federal budget runs structural deficits in the range of 5 pct to 6 pct or more of the Gross National Product."

The executives, who have banded together as the "Bipartisan Budget Appeal" coalition, say the Reagan Administration, using increased Soviet spending as a justification for U.S. expenditures, "does not tell us how much to spend to counter that threat."

One place where the relationship between programs and viable goals does not appear adequately documented, they say, is in the area of unnecessary duplication or redundancy. There is a question, the coalition says, of whether the vast array of overlapping strategic forces is necessary.

"We do not question the need for strong and modern strategic bomber and missile forces," the coalition says. "The question is whether compelling arguments have yet been advanced in favor of all the procurement that the Administration has proposed."

"It is simply not plausible," says Lee L. Morgan, Caterpillar Tractor's CEO, "that in a budget of this vast size every dollar for defense spending is necessary to our survival as a nation."

The coalition, which also includes 65 former Cabinet officers and Presidential advisers, points out that "no nation can long maintain a strong foreign policy without a strong economy."

They call for a revised, multi-year defense budget plan that "builds on the progress already made and which is steady, coherent and has major bipartisan support."

The size and potential influence of the opposition indicates widespread concern that the White House proposals are not sustainable—economically—with current Federal revenues.

Another group, which includes three former cabinet officials under Democratic Presidents and a former chief of naval operations, claims that President Reagan's defense budget is unrealistic and should be cut substantially.

The group includes Robert McNamara, defense secretary under Presidents John Kennedy and Lyndon Johnson; McGeorge Bundy, national security adviser in those administrations; Cyrus Vance, a former Pentagon official and secretary of state under President Jimmy Carter, and Adm. Elmo Zumwalt, former chief of naval operations.

They propose $135.9 billion in defense cuts over the next five years. They say the reductions are necessary to reduce budget deficits, thereby strengthening the economy.

Mr. Vance says that if the Administration make the recommended cuts "it will be seen by our allies, friends and adversaries, not as a sign of weakness, but a sign of wisdom, determination and common sense."

In a letter to the Senate Budget Committee, the group said, "The economic foundations of our national security, which are every bit as important as the defense component, have been undermined."

They said huge deficits projected for future years must be cut in order to bring down longterm interest rates and allow sustained economic recovery.

The group proposes total cuts of $156.4 billion below Administration proposals from 1983 through 1988. At the same time, they advocate $20.5 billion for improvements in the National Guard and reserve forces and substitution of fast sea lift for additional airlift capacity. Thus, the net total reduction called for between 1983 and 1988 would be $135.9 billion.

Support for President Reagan's defense spending posture has come in the form of a classified Pentagon document proposing spending almost $2 trillion during the next five years to strengthen this country's defense position. The plan, drawn up by the highest civilian levels of the Pentagon, the Joint Chiefs of Staff and U.S. military commanders around the world, reflects Reagan Administration thinking about military policy and priorities for the rest of the decade.

A memo signed by Defense Secretary Weinberger says, "we must improve the flexibility of our forces to respond to an increasing number of possible missions that may be forced upon us by a world not of our making."

Called the "Fiscal Year, 1985-89, Defense Guidance Document," the pamphlet covers national security objectives, regional defense policies, strategy, resources and fiscal planning and project expenditures of $1.958 trillion through this decade.

The document emphasizes strengthening conventional U.S. forces in hopes that such a buildup might decrease the possibility of a prolonged nuclear war. It dwells heavily on upgrading the mobility and readiness of the military and its command and control facilities. □

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EFFECTIVE APRIL 11, 1983

MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective April 11, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,651	1,676	20,460	24,515
Capability Utilization Rate	57.1	58.0	49.9	58.8

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.862
Pig Iron* * (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton = 2240 lbs.)	$ 71.17	$ 71.17	$ 72.83	$ 75.50
No. 2 bundles	$ 49.17	$ 49.17	$ 51.83	$ 50.50
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 75.50	$ 75.50	$ 77.50	$ 85.50
No. 1 steel, Philadelphia	65.50	65.50	63.50	71.50
No. 1 steel, Chicago	72.50	72.50	77.50	69.50
No. 1 bundles, Detroit	75.50	75.50	76.50	73.50
Low Phos., Youngstown	69.50	69.50	69.50	86.50
No. 1 mach'y cast., Pgh	76.50	76.50	79.50	86.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	113.50
No. 1 mach'y cast., Chi	110.50	110.50	112.50	122.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective April 11, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	78.50-80.00	80.00	4/8/83
Lead	21.00-23.00	20.50-23.00	3/30/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00	38.00-40.00	3/29/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas .$2.00
Beryllium-aluminum 5% Be, per lb. contained Be.....$201.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200.....$166.00
Bismuth, ton lots .....$1.55-$1.60
Cadmium, under one ton .....$1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8%.....$3.75
Cobalt, 99%, cathode.....$12.50
Gold per troy oz. $426.75
Indium, dollars per troy oz.....$3.10
Iridium, dollars per troy oz.....$600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76 lb. f.o.b. N.Y. ..$320-$335
Molybdenum, lb. tech. moly oxides, 20 lb. MO can.....$5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz.....$11.23
Vanadium $4.94
Zirconium sponge.....$12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Apr. 4—606.79 Apr. 7—621.49
Apr. 5—605.79 Apr. 8—631.38
Apr. 6—611.73

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	75½	66¼
Yellow brass	63⅜	61¼
Red brass	69¼	66⅛
Comm. bronze	70⅞	67¾
Mang. bronze	62¼	60½
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	69
No. 2 copper wire	60
Light copper	51

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	65
No. 2 copper wire	56
Light copper	47
No. 1 composition	53
No. 1 comp. turnings	49
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	27
Radiators	43

Aluminum

New mixed clips	34	—35
Old sheet	32	—33
Old cast	32	—33
Clean dry borings	33	—34

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	27	—28
Mixed L.C. clips	24	—25
Old sheets and cast	19	—20
Borings and turnings	13	—14
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	58	—59
No. 2 copper wire	51	—52
Light copper	44	—45
Radiators	37	—38
No. 1 composition	46	—47
No. 1 composition turn'gs	42	—44
Cocks and faucets	32	—33
Clean heavy yellow brass	31	—32
Brass Pipe	31	—32
New soft brass clippings	46	—47

Lead

Heavy soft lead	10	—11
Whole batteries	4	— 5
Type metal	15	—16
Electrotype	17	—18

Nickel

Nickel solids	95	—100
Nickel rod ends	95	—100
Nickel sheets, clips	95	—100
Nickel turnings	45	— 50

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

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EFFECTIVE APRIL 11, 1983

MATERIALS NEWSFRONT

(Effective April 11, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 75.00 to	$ 76.00
No. 2 hvy. melting	65.00 to	66.00
No. 1 dealer bundles	83.00 to	84.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	83.00 to	84.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	30.00 to	31.00
Low phos. punchings plate	91.00 to	92.00
Heavy turnings	65.00 to	66.00
No. 1 RR hvy. melting	85.00 to	86.00
Rails 2 ft. and under	96.00 to	97.00
Scrap rails, random lgth.	88.00 to	89.00
RR specialties	93.00 to	94.00
No. 1 machinery cast	76.00 to	77.00
Cupola cast	69.00 to	70.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	580.00 to	590.00
18-8 turnings	480.00 to	490.00

Chicago

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	61.00 to	62.00
No. 1 dealer bundles	84.00 to	85.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	49.00 to	50.00
No. 1 busheling	80.00 to	81.00
Shredder scrap	75.00 to	76.00
Machine shop turn.	17.00 to	18.00
Mixed bor. and turn.	18.00 to	19.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	40.00 to	41.00
Low phos. forge crop	89.00 to	90.00
Low phos. punchings plate ¼ in. and heavier	96.00 to	97.00
Low phos. 2 ft. and under	90.00 to	91.00
No. 1 RR hvy. melting	79.00 to	80.00
Scrap rails, random lgth.	71.00 to	72.00
Reroller rails	96.00 to	97.00
Rails, 2 ft. and under	93.00 to	94.00
RR couplers and knuckles	81.00 to	82.00
RR car axles	104.00 to	105.00
No. 1 machinery cast	110.00 to	111.00
Cupola cast	95.00 to	96.00
Stove plate	94.00 to	95.00
Steel car wheels	82.00 to	83.00
Stainless		
18-8 bundles and solids	530.00 to	540.00
18-8 turnings	430.00 to	440.00
430 bundles and solids	135.00 to	140.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	$ 64.00 to	$ 67.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	77.00 to	80.00
No. 2 dealer bundles	45.00 to	48.00
No. 1 busheling	77.00 to	80.00
Shredder scrap	76.00 to	79.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	43.00 to	46.00
Low phos. 5 ft. and under	77.00 to	80.00
Low phos. 2 ft. punchings	91.00 to	94.00
Electric furnace bundles	95.00 to	98.00
RR specialties	80.00 to	83.00
Rails, 2 ft. and under	93.00 to	96.00
Cupola cast	60.00 to	63.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00 to	$ 50.00
No. 2 hvy. melting	47.00 to	48.00
No. 1 dealer bundles	75.00 to	76.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	72.00 to	73.00
Drop forge flashings	44.00 to	45.00
Machine shop turn.	27.00 to	28.00
Mixed borings and turn.	13.00 to	14.00
Shoveling turnings	27.00 to	28.00
Cast iron borings	13.00 to	14.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	480.00 to	490.00
18-8 turnings	360.00 to	370.00
430 bundles and solids	120.00 to	130.00

Youngstown

No. 1 hvy. melting	$ 62.00 to	$ 63.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	69.00 to	70.00
Electric furnace bundles	70.00 to	71.00
Galvanized bundles	60.00 to	61.00

Cleveland

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	74.00 to	75.00
No. 1 factory bundles	81.00 to	82.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	74.00 to	75.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	92.00 to	93.00
Low phos. punchings plate	92.00 to	93.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	96.00 to	97.00
Rails, 18 in. and under	97.00 to	98.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	89.00 to	90.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	275.00 to	285.00
18-8 turnings	225.00 to	235.00
430 bundles	75.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 busheling	38.00 to	39.00
No. 1 dealer bundles	36.00 to	38.00
No. [illegible]	20.00 to	21.00
Machine [illegible]	9.00 to	10.00
Mixed bor. and turn.	16.00 to	17.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	15.00 to	16.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	50.00 to	51.00
Scrap rails, random lgth.	30.00 to	31.00
No. 1 machinery cast	71.00 to	72.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 61.00 to	$ 62.00
No. 2 hvy. melting	50.00 to	51.00
Foundry steel, 2 ft.	50.00 to	51.00
No. 1 dealer bundles	61.00 to	62.00
No. 2 bundles	47.00 to	48.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	61.00 to	62.00
Rails, random length	61.00 to	62.00
Rails, 18 in. and under	76.00 to	77.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	82.00 to	83.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	96.00 to	97.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 64.00 to	$ 65.00
No. 2 heavy melting	59.00 to	60.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	64.00 to	65.00
Shredder scrap	77.00 to	78.00
Machine shop. turn.	24.00 to	25.00
Shoveling turnings	35.00 to	36.00
Cast iron borings	35.00 to	36.00
Electric furnace bundles	64.00 to	65.00
Elec. furnace, 3 ft. & under	59.00 to	60.00
Structural and plate, 2 ft.	78.00 to	79.00
Structural and plate, 4 ft.	76.00 to	77.00
No. 1 RR hvy. melting	63.00 to	64.00
Scrap rails, random lgth.	63.00 to	64.00
Rails, 18 in. and under	82.00 to	83.00
Angles and splice bars	76.00 to	77.00
No. 1 cupola cast	83.00 to	84.00
Unstripped motor blocks	57.00 to	58.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 52.00
No. 2 hvy. melting	48.00 to	49.00
No. 1 dealer bundles	57.00 to	58.00
No. 2 bundles	30.00 to	31.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	11.00 to	12.00
Low phos. 18 in. and under	78.00 to	79.00
Rails, random length	60.00 to	61.00
Rails, 2 ft. and under	82.00 to	83.00
No. 1 cupola cast	65.00 to	66.00
Heavy breakable cast	29.00 to	30.00
Drop broken cast	69.00 to	70.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	480.00 to	500.00
18-8 turnings	375.00 to	390.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	40.00 to	42.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	40.00 to	42.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 43.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	37.00
No. 1 dealer bundles	30.00 to	32.00
No. 2 dealer bundles	14.00 to	16.00
Machine shop turn.	6.00 to	8.00
Cast iron borings	6.00 to	8.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 42.00 to	$ 44.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	6.00 to	8.00
Shoveling turnings	10.00 to	12.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under (foundry)	86.00 to	88.00
No. 1 cupola cast	88.00 to	90.00

Seattle

No. 1 hvy. melting	$ 60.00 to	$ 62.00
No. 2 hvy. melting	49.00 to	51.00
No. 2 bundles	38.00 to	40.00
No. 1 cupola cast	94.00 to	96.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 55.00
No. 2 heavy melting cut 2 ft. and under	52.00
No. 1 dealer bundles	60.00
No. 2 bundles	30.00
Mixed steel scrap	34.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	25.00
Short steel turn.	28.00
Mixed bor. and turn.	15.00
Cast scrap	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	53.00 to	55.00
No. 2 bundles	36.00 to	38.00
Machine shop turn.	20.00 to	21.00
Crushed turnings	36.00 to	38.00
Shredder scrap	69.00 to	70.00
Cut structural plate 2 ft. and under	86.00 to	88.00
Unstripped motor blocks	60.00 to	62.00
Cupola cast	72.00 to	74.00

Chilton's

MAY 2, 1983

IRON AGE

THE MAGAZINE FOR METAL PRODUCING MANAGEMENT

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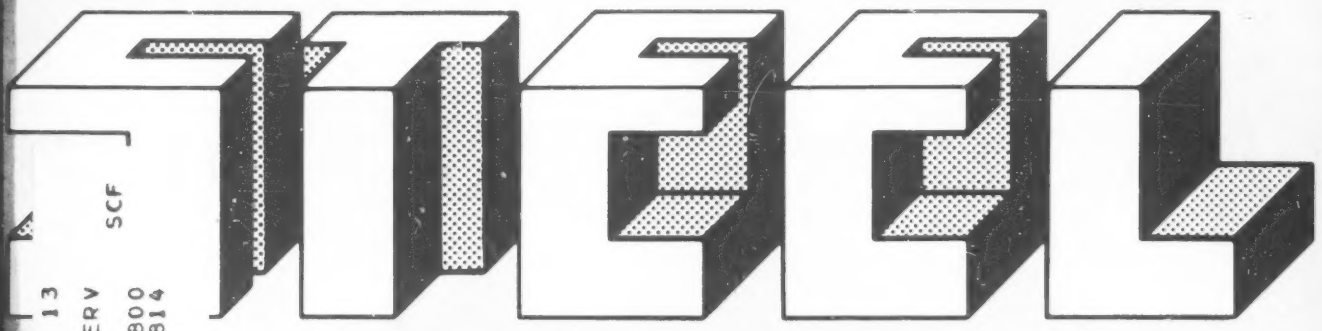

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LONG-TERM RELIEF TO IMPORT PROBLEM COULD BE JUST AROUND THE CORNER

SENSORS IN STEEL: WHERE A PICTURE IS WORTH MORE THAN A THOUSAND WORDS

PROCESS AUTOMATION IN AND WORKING AT INLAND

ANNUAL STEEL/NONFERROUS FINANCIAL ANALYSIS: A YEAR TWO INDUSTRIES LOST A BUNDLE

BEST AVAILABLE COPY

VOL. 226, NO. 13

IRON AGE

MAY 2, 1983

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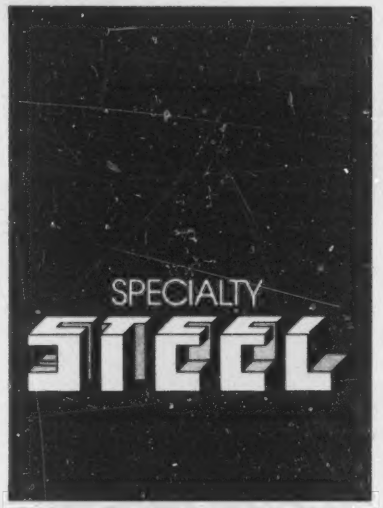

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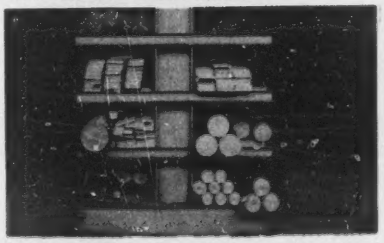

Service centers: Does the recession cloud have a silver lining?

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EFFECTIVE APRIL 18, 1983

MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Rickards Mether as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective April 18, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,687	1,651	22,147	26,084
Capability Utilization Rate	58.4	57.1	50.5	58.4

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.862
Pig Iron* * (Net ton= 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 70.83	$ 71.17	$ 72.83	$ 73.17
No. 2 bundles	$ 48.50	$ 49.17	$ 51.83	$ 49.17
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 75.50	$ 75.50	$ 77.50	$ 83.50
No. 1 steel, Philadelphia	64.50	65.50	63.50	71.50
No. 1 steel, Chicago	72.50	72.50	77.50	64.50
No. 1 bundles, Detroit	75.50	75.50	76.50	66.50
Low Phos., Youngstown	69.50	69.50	69.50	83.50
No. 1 mach'y cast., Pgh	76.50	76.50	79.50	86.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	113.50
No. 1 mach'y cast., Chi	110.50	110.50	112.50	119.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective April 18, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	79.50-80.00	78.50-80.00	4/13/83
Lead	21.00-23.00	20.50-23.00	3/30/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00	38.00-40.00	3/29/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.55-$1.60
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $443.00
Indium, dollars per troy oz. $3.10
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$320-$335
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $12.37
Vanadium $4.94
Zirconium sponge ..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Apr. 11—621.24
Apr. 12—626.36
Apr. 13—624.90
Apr. 14—625.45
Apr. 15—625.89

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	75½	66¼
Yellow brass	63⅜	61¼
Red brass	69¼	66⅛
Comm. bronze	70⅞	67¾
Mang. bronze	62¼	60½
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	69
No. 2 copper wire	60
Light copper	51

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	65
No. 2 copper wire	56
Light copper	47
No. 1 composition	54
No. 1 comp. turnings	50
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	27
Radiators	44

Aluminum

New mixed clips	35	—36
Old sheet	34	—35
Old cast	34	—35
Clean dry borings	34	—35

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	27	—28
Mixed L.C. clips	24	—25
Old sheets and cast	19	—20
Borings and turnings	13	—14
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	58	—59
No. 2 copper wire	51	—52
Light copper	44	—45
Radiators	37	—38
No. 1 composition	46	—47
No. 1 composition turn'gs	42	—44
Cocks and faucets	32	—33
Clean heavy yellow brass	31	—32
Brass Pipe	31	—32
New soft brass clippings	46	—47

Lead

Heavy soft lead	10	—11
Whole batteries	4	— 5
Type metal	15	—16
Electrotype	17	—18

Nickel

Nickel solids	95	—100
Nickel rod ends	95	—100
Nickel sheets, clips	95	—100
Nickel turnings	45	— 50

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

EFFECTIVE APRIL 18, 1983

MATERIALS NEWSFRONT

(Effective April 18, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 75.00 to	$ 76.00
No. 2 hvy. melting	70.00 to	71.00
No. 1 dealer bundles	83.00 to	84.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	83.00 to	84.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	28.00 to	29.00
Cast iron borings	27.00 to	28.00
Low phos. punchings plate	91.00 to	92.00
Heavy turnings	70.00 to	71.00
No. 1 RR hvy. melting	85.00 to	86.00
Rails 2 ft. and under	96.00 to	97.00
Scrap rails, random lgth.	88.00 to	89.00
RR specialties	93.00 to	94.00
No. 1 machinery cast	76.00 to	77.00
Cupola cast	69.00 to	70.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	590.00 to	600.00
18-8 turnings	490.00 to	500.00

Chicago

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	61.00 to	62.00
No. 1 dealer bundles	84.00 to	85.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	49.00 to	50.00
No. 1 busheling	79.00 to	80.00
Shredder scrap	75.00 to	76.00
Machine shop turn.	17.00 to	18.00
Mixed bor. and turn.	18.00 to	19.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	40.00 to	41.00
Low phos. forge crop	89.00 to	90.00
Low phos. punchings plate ¼ in. and heavier	96.00 to	97.00
Low phos. 2 ft. and under	90.00 to	91.00
No. 1 RR hvy. melting	79.00 to	80.00
Scrap rails, random lgth.	71.00 to	72.00
Reroller rails	96.00 to	97.00
Rails, 2 ft. and under	93.00 to	94.00
RR couplers and knuckles	81.00 to	82.00
RR car axles	104.00 to	105.00
No. 1 machinery cast	110.00 to	111.00
Cupola cast	95.00 to	96.00
Stove plate	94.00 to	95.00
Steel car wheels	82.00 to	83.00
Stainless		
18-8 bundles and solids	550.00 to	560.00
18-8 turnings	450.00 to	460.00
430 bundles and solids	135.00 to	140.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	$ 63.00 to	$ 66.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	74.00 to	77.00
No. 2 dealer bundles	43.00 to	46.00
No. 1 busheling	74.00 to	77.00
Shredder scrap	73.00 to	76.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	43.00 to	46.00
Low phos. 5 ft. and under	73.00 to	76.00
Low phos. 2 ft. punchings	91.00 to	94.00
Electric furnace bundles	95.00 to	98.00
RR specialties	80.00 to	83.00
Rails, 2 ft. and under	93.00 to	96.00
Cupola cast	60.00 to	63.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00 to	$ 50.00
No. 2 hvy. melting	47.00 to	48.00
No. 1 dealer bundles	75.00 to	76.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	72.00 to	73.00
Drop forge flashings	44.00 to	45.00
Machine shop turn.	27.00 to	28.00
Mixed borings and turn.	13.00 to	14.00
Shoveling turnings	27.00 to	28.00
Cast iron borings	13.00 to	14.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	480.00 to	490.00
18-8 turnings	360.00 to	370.00
430 bundles and solids	120.00 to	130.00

Youngstown

No. 1 hvy. melting	$ 62.00 to	$ 63.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	69.00 to	70.00
Electric furnace bundles	70.00 to	71.00
Galvanized bundles	60.00 to	61.00

Cleveland

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	74.00 to	75.00
No. 1 factory bundles	81.00 to	82.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	74.00 to	75.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	92.00 to	93.00
Low phos. punchings plate	92.00 to	93.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	96.00 to	97.00
Rails, 18 in. and under	97.00 to	98.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	89.00 to	90.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	305.00 to	315.00
18-8 turnings	255.00 to	265.00
430 bundles	80.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 busheling	38.00 to	39.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.	9.00 to	10.00
Mixed bor. and turn.	16.00 to	17.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	15.00 to	16.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	50.00 to	51.00
Scrap rails, random lgth.	30.00 to	31.00
No. 1 machinery cast	71.00 to	72.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 61.00 to	$ 62.00
No. 2 hvy. melting	50.00 to	51.00
Foundry steel, 2 ft.	50.00 to	51.00
No. 1 dealer bundles	61.00 to	62.00
No. 2 bundles	47.00 to	48.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	61.00 to	62.00
Rails, random length	61.00 to	62.00
Rails, 18 in. and under	76.00 to	77.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	82.00 to	83.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	96.00 to	97.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 64.00 to	$ 65.00
No. 2 heavy melting	59.00 to	60.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	64.00 to	65.00
Shredder scrap	77.00 to	78.00
Machine shop. turn.	24.00 to	25.00
Shoveling turnings	35.00 to	36.00
Cast iron borings	35.00 to	36.00
Electric furnace bundles	64.00 to	65.00
Elec. furnace, 3 ft. & under	59.00 to	60.00
Structural and plate, 2 ft.	79.00 to	80.00
Structural and plate, 4 ft.	77.00 to	78.00
No. 1 RR hvy. melting	63.00 to	64.00
Scrap rails, random lgth.	68.00 to	69.00
Rails, 18 in. and under	86.00 to	87.00
Angles and splice bars	76.00 to	77.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	59.00 to	60.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 52.00
No. 2 hvy. melting	48.00 to	49.00
No. 1 dealer bundles	57.00 to	58.00
No. 2 bundles	30.00 to	31.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	11.00 to	12.00
Low phos. 18 in. and under	78.00 to	79.00
Rails, random length	60.00 to	61.00
Rails, 2 ft. and under	82.00 to	83.00
No. 1 cupola cast	65.00 to	66.00
Heavy breakable cast	29.00 to	30.00
Drop broken cast	69.00 to	70.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	480.00 to	500.00
18-8 turnings	375.00 to	390.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	40.00 to	42.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	40.00 to	42.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 43.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	37.00
No. 1 dealer bundles	30.00 to	32.00
No. 2 dealer bundles	14.00 to	16.00
Machine shop turn.	6.00 to	8.00
Cast iron borings	6.00 to	8.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 42.00 to	$ 44.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	6.00 to	8.00
Shoveling turnings	10.00 to	12.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under (foundry)	86.00 to	88.00
No. 1 cupola cast	88.00 to	90.00

Seattle

No. 1 hvy. melting	$ 60.00 to	$ 62.00
No. 2 hvy. melting	49.00 to	51.00
No. 2 bundles	38.00 to	40.00
No. 1 cupola cast	94.00 to	96.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 55.00
No. 2 heavy melting cut 2 ft. and under	52.00
No. 1 dealer bundles	60.00
No. 2 bundles	30.00
Mixed steel scrap	34.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	25.00
Short steel turn.	28.00
Mixed bor. and turn.	15.00
Cast scrap	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	53.00 to	55.00
No. 2 bundles	36.00 to	38.00
Machine shop turn.	20.00 to	21.00
Crushed turnings	36.00 to	38.00
Shredder scrap	69.00 to	70.00
Cut structural plate 2 ft. and under	86.00 to	88.00
Unstripped motor blocks	60.00 to	62.00
Cupola cast	72.00 to	74.00

STEEL PRICES

Codes identify Producers listed in the Key on page 79. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A.—Not available.

Billets, Blooms, Slabs
(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10, U1	$453.00
R3	$453.00
Midwest	
R3, U1, W5	$453.00
S1	$453.00
C10	$453.00
K2	$453.00
W5	$453.00
West	
B3(2)	$463.00
C6	$453.00
South	
A7	$453.00
Alloy, East	
R3, C10	$492.00
B3	$492.00
Midwest	
W8, W5, C10	$492.00
S1, U1	$492.00
R3	$492.00
West	
B3	$502.00
C6	$469.00
South	
A7	$492.00

Piling Sheet Steel
(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7	24.15
C20	22.90
W8	22.90
I3, T10, U1, N4	23.90
West	
C6	25.10
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	23.90
W8	24.15
U1	23.90
I3	23.90
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	23.90
I3	23.90
West	
U1	24.40
C6	24.15
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut ll Edge—all widths, East	
B3, U1	22.05
J3	22.05
Midwest	
A7, D1	22.05
I4	21.45
S1, J3, D1	22.05
W3	22.05
N4	22.55
W5	22.05
U1	22.05
B3, G2, I3, M2, R3, G3	22.05
West	
K1	20.80
B3	24.70
South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
R7, S10, B4	29.60
P15	24.80
S7	Cmp*
U1	35.30
D1(1)	Cmp*
B4	31.55
Midwest	
G4	24.80
I4	35.30
W14	22.95
S1, J4	34.05
T4	Cmp*
*Composite pricing	
West	
U1	33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, (plus extras)†	
Midwest	
M2, G3, R3, W3, I4, J3, G2, I3	22.05
A7	22.05
S1	22.05
West	
K1	22.05
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)†	
S1	24.60
G4	25.80
I4	23.70
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	42.60
P15	32.10
Midwest	
I4	41.80
S1	42.30

Sheets
Hot-Rolled, Carbon (18 Ga & Hvyr), East

B3	22.05
J3	22.05
U1	22.05
Midwest	
A7, U1, B3, G2, G3, I3, M2, R3, W3	22.05
S1, W5, D1	22.05
J3	22.05
I4	21.15
West	
U1	21.30
K1	22.05
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2), U1	26.15
J3	26.15
Midwest	
B3, I3, G3, R3, M2, U1(2)	26.15
G2, W3, M11	26.15
I4	22.00
J3, A7	26.15
S1, W5, D1	26.15
West	
U1	26.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2), U1	28.00
Midwest	
J3, D1	28.00
I3, W5, S1	28.00
U1, A7, R3, Y1	28.00
G2, W3, M11	28.00
West	
K1	27.15
U1	28.50
South	
U1	28.00
R3	28.00
Enameling, Midwest	
A7, I3, U1, J3	27.65
S1	26.50
Long-Terne, Midwest	
W5	28.30
A7, U1	29.35
R3	29.35
†Actual weight basis	

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
B3	23.25
South	
G7	22.35

Tinplate
Electrolytic Tinplate
Single Reduced (70 lb)

East	per base box
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$26.79
U1	26.79
South	
U1	$26.29
Double Reduced (55 lb)**	
Midwest	
M11 (50 lb)	$21.49
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$21.99
U1	21.99
South	
U1	$21.49
Black Plate	
Single Reduced (75 lb)*	
East	
B3	$24.01
Midwest	
J3	$24.01
M11	24.01
I3, U1, W5	24.01
W3	24.01
West	
K1	$24.01
U1	23.36
Double Reduced (55 lb)	
East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

*70 lb—base weight extra 45¢
**50 lb—base weight extra $1.40

Bars
Carbon Steel, Hot-Rolled (Special quality)

East	
R3, K3	25.80
R5	25.80
B3(3), J3	25.80
U1, C10	25.80
Midwest	
A7	23.95
U1, I3, I4, C20, N4	25.80
R3, T10	25.80
K2	25.80
I3	19.50*
West	
B3	25.80
C6	24.45
B3	24.70
South	
A8	20.65
A7	25.80
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
C21	21.15
J3(4), L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	31.00
M1	23.025
B4, C10	31.00
Midwest	
B5, W10, Y1, W8, R3	33.25
J3	31.00
B1	19.80
L2	30.75
N9	31.00
P3	19.85+CMS
W14	22.20
J3(3)	31.00
B5	31.25
J3	31.00
West	
B5	31.20
B5	34.90
R3	37.15
South	
B5	32.85
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10, U1	27.95
R3	27.95
J3	27.95
Midwest	
A7, U1, R3	27.95
I3, C10	27.95
I4	27.95
I3	21.00*
West	
B3	27.95
B5	18.50
C6	26.60
B3	27.10
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	37.90
M1	28.025
R4	25.65
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	34.25
Midwest	
B5, R3, C10	37.35
C2	28.275
J3, M9, W10	34.85
P3	22.75
B1	22.70
N9	34.85
L2	34.85
B5	35.10
J3	36.0
J3	34.85
West	
R3	40.75
B5	35.20
B5	38.25
South	
J3	35.85
C16	28.00
B5	36.75

Plates

Carbon Steel, East	
B3(2), U1	25.75
L4	25.75
P2	25.75
J3	26.75
Midwest	
B3, S1	25.75
I3	25.75
J3, A7	22.80
U1, I4	25.75
R3	26.75
West	
A7, B3, C6, O2	24.25
K1	23.50
U1	25.75
South	
R3	25.75
A7	25.75
U1	25.75
Alloy, East	
B3, J3	33.55
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	33.55
G2, G3	33.55
I4, U1	33.55
West	
B3	33.55
O2	30.55
K1	31.30
South	
A7	27.55

Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
U1	27.70
A7, R3	24.80
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
A7	25.95
C1	24.95

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities* / City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	22.82	27.91	30.85	32.00	24.87	27.14	18.55	33.15	42.10	52.60	69.58	73.19
Baltimore	30.00	26.59	34.60	36.75	30.24	32.60	20.27	36.44	55.85	59.91	67.79	76.32
Birmingham	22.70	28.30	31.71	32.31	24.70	26.98	18.16	33.62	49.31	68.90	68.16	74.43
Boston	25.28	29.94	33.94	44.44	37.16	37.52	20.68	40.96	48.40	52.69	62.29	67.33
Buffalo	28.17	33.76	39.72	43.01	34.96	28.77	17.57	38.85	39.03	48.82	58.33	64.06
Chicago	23.88	29.02	31.40	29.72	24.41	26.35	15.64	31.16	35.22	39.47	45.50	50.88
Cincinnati	24.17	29.98	32.82	32.02	26.12	27.61	15.18	32.27	35.17	40.02	45.20	51.05
Cleveland	26.57	31.04	33.35	32.65	27.23	28.47	15.55	32.90	36.23	41.57	46.44	52.48
Denver	32.01	38.28	36.73	41.26	36.46	35.59	21.15	44.51	51.78	59.12	67.62	75.96
Detroit	25.02	31.65	32.95	32.42	26.31	26.79	15.04	32.56	35.65	39.68	45.12	51.26
Houston	23.32	29.62	33.90	41.35	34.12	38.36	17.62	39.25	39.26	45.22	53.75	60.10
Kansas City	24.43	28.21	31.43	30.53	30.66	33.35	17.37	34.33	42.43	51.71	57.20	64.82
Los Angeles	30.05	33.60	39.14	45.92	37.83	38.95	33.49	50.38	62.24	72.74	78.34	88.90
Memphis	31.68	36.62	36.40	38.57	30.45	34.49	21.97	41.48	52.82	56.96	67.85	77.44
Milwaukee	23.40	29.46	32.07	31.10	27.18	27.40	15.17	32.21	35.61	40.88	46.30	52.45
New York	23.60	28.46	32.55	42.75	31.67	33.54	19.44	41.89	46.59	53.04	62.17	69.31
Philadelphia	29.78	35.33	38.34	45.07	32.21	34.46	19.58	41.11	46.41	52.66	62.06	69.23
Pittsburgh	25.68	30.43	34.47	41.36	34.34	29.51	20.40	41.06	46.51	54.05	61.11	68.83
Portland	29.67	37.16	41.51	33.10	34.82	38.20	53.64	56.85	61.00	64.10	66.10	....
San Francisco	29.58	36.18	40.25	45.78	38.70	39.18	27.12	51.14	63.09	72.30	78.49	86.10
Seattle	29.95	35.14	38.44	46.76	32.89	35.32	31.46	51.38	64.02	70.14	73.83	87.67
Spokane	21.08	30.56	33.56	36.69	35.18	25.16	20.32	41.00	42.02	46.30	....	58.32
St. Louis	20.21	30.76	34.12	32.54	28.06	28.31	16.57	33.45	38.46	43.65	51.02	57.48
St. Paul	23.96	28.55	32.40	35.20	27.86	28.12	15.25	34.13	36.60	41.88	46.58	53.31

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ¾-2 15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1¾" round; Cold drawn—1" round; Hot-rolled 4140—1⅛" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

METALWORKING PRICE TRENDS

The great price wring-out goes on

The industrial price scene now is a mix of disinflation and outright deflation.

In March, deflation ruled the scene. The Labor Dept.'s seasonally adjusted producer price index for finished goods moved down from February by 0.1 pct. This followed a 1.0 pct decline in January and a 0.1 pct rise in February.

Prices of producer goods in March, led by the third monthly sharp drop in energy prices, closed out the best quarterly decline since 1952.

On an annual basis, the fall in first quarter prices came out to a 4.1 pct annual rate.

Almost all of the first quarter decline in prices was due to tumbling energy prices. In March, the finished goods energy index fell 3.2 pct (38 pct annual rate), the fourth straight month of decline.

A number of economists are now talking of a producer goods price rise this year of less than 1 pct. Last year, these prices rose by 3.5 pct.

For capital equipment in March, the story was one of disinflation, not deflation. The price index for this equipment rose by 0.4 pct from the February level. In February, the rise was a 0.5 pct one.

Prices of key metalworking products, as listed on the table here, have caught the disinflation spirit. On average, the March price rise for the 22 product lines came out to less than 0.1 pct. On an annual rate basis this would come to 0.7 pct.

Exactly one-half of the listed product lines showed deflated prices, or no price changes at all, during March.

The steepest March price rise for these products was scored by plumbing fixtures and brass fittings—and that was only a 0.7 pct rise. It is felt that this rise reflected the spurting recovery in home building.

The metalworking product leading on the price down side in March was light trucks. Mixed reasons are given for this rise, and it remains unclear just what was the cause.

A number of economists feel that the disinflationary/deflationary price trend will hold at least through the second and third quarters. Business recovery, they note, is coming gradually. Market demand, in relation to supply capability, will likely remain in easy balance for some time yet.

Also, industry demands for capital will likely be moderate and not compete strongly with the government for available funds over the next few periods.

Latest Month Covered: March, 1983

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	374.7	− 0.1	+ 2.7
Metal Forming Machine Tools	414.4	0	+ 4.1
Agricultural Machinery & Equip.	322.8	+ 0.1	+ 5.4
Construction Machinery & Equip.	349.6	+ 0.4	+ 3.1
Industrial Process Furnace & Ovens	358.4	+ 0.4	+ 4.1
Industrial Material Handling Equip.	285.2	0	− 0.9
Pumps, Compressors & Allied Equip.	347.8	− 0.5	+ 0.3
Fluid Power Equip. (Dec. 1970 = 100)	251.5	0	+ 4.3
Mechanical Power Transmission Equip.	314.5	+ 0.1	+ 0.8
Automobiles	218.9	0	+ 4.1
Motor Trucks—Light	273.3	− 0.8	+ 7.9
Motor Trucks—Heavy	317.6	0	+ 6.8
Railroad Equipment	357.4	0	+ 3.2
Fabricated Metal Structural Products	303.7	+ 0.4	− 0.3
Electric Motors	303.0	+ 0.2	+ 3.7
Valves (Metal, Ex-Fluid Power—Dec. 1982=100)	100.0	− 0.8	NA
Ball & Roller Bearings	331.2	0	+ 2.8
Cutting Tools & Accessories	273.4	+ 0.2	+ 1.1
Heating Equipment	241.1	+ 0.1	+ 2.4
Plumbing Fixtures & Brass Fittings	285.5	+ 0.7	+ 2.3
Metal Containers	331.6	+ 0.4	+ 1.3
Miscellaneous Metal Products	289.8	+ 0.4	+ 3.9

Data based on U.S. Labor Dept.'s Producer Price Index

FINANCIAL ANALYSIS: STEEL—A DEPRESSED '82 NONFERROUS—A WEAK YEAR

Steelmakers, had their worst year since '30s, only seven making a profit. Nonferrous producers felt the full bite of the Great Recession.

By Paul Cathey and Robert J. Regan

Steel

For steelmakers, 1982 was an unwelcome return to the grim days of the 1930s. As Republic Steel puts it in the company's annual report, "Not since the Great Depression has the American steel industry experienced a year like 1982."

The *Iron Age* Steel Industry Financial Analysis (see over) shows that among 26 of the large steel producers only 7 achieved a profit in '82—Nucor, Kaiser, Chaparral, Lukens, Interlake, Athlone and Carpenter Technology.

This was hardly surprising in a year that raw steel production fell 39 pct and steel shipments dropped 30 pct, according to American Iron and Steel Institute figures. And operating capacity for the year was below 50 pct.

To duplicate last year's unmitigated disaster, you have to go back to 1938 when the steel industry operated below 40 pct of capacity and lost $14.9 million. In 1933 at 33 pct of capacity, steelmakers had a loss of $59.7 million.

Negative records were established in many areas in 1982. Bethlehem's loss of $1.5 billion was the second largest loss in American corporate history.

Operating on the theory that if you have a lemon make lemonade, Bethlehem, National and others took large write-offs, hoping to pave the way for an earnings recovery this year.

Because of the losses, many companies paid no taxes, and obtained credits against future taxes. Nineteen of the twenty-six companies reporting are eligible for tax credits.

It cost steel companies heavily even to keep from losing more ground. United States Steel's loss of $361 million was kept from going higher by operating income from acquired Marathon Oil.

But in terms of debt, the Marathon purchase boosted USS' interest charges of $911 million. This was more than half the total steel industry's interest expense of $1.6 billion on its funded debt. Industry debt service charges last year rose over 100 pct from 1981's $825 million.

From first to last the steel industry's record in 1982 was a series of parenthesis and minus signs indicating losses, declines or tax credits. Net sales were down 12.3 pct. Operating profit was off almost 93 pct. Working capital fell 42 pct. Stockholders' equity declined 15.5 pct.

The industry's net loss for the year was $3.3 billion, compared with a gain of $2.2 billion in 1981.

Operating profit as a pct of sales was only 1 pct last year. contrasted with 1981's healthy 11.9 pct.

Nonferrous

For the nonferrous metals industry, 1982 wasn't a year to write home about—unless it was to ask for more money. Profits—where there were any at all—were down. So were sales, shipments, capital spending and just about any type of spending management could exert any control over.

In 1982, official Washington was still fighting inflation with high interest rates and business fought the consequent drop in consumer demand with layoffs, curbs on hiring, salaries and investment in new plant and equipment.

Primary and secondary metals producers held output schedules to minimums and their customers—from fabricators to finished goods makers—held inventories to a minimum.

The copper producers in the U.S. and Canada bore the brunt of the production cutting required to keep the world supply from getting completely out of hand. Even so, a drop of about 600,000 tons in North Africa output wasn't enough to keep the visible stock worldwide from increasing by 300,000 tons and the penalty was a decline in the average U.S. price to about 73¢ from nearly 84¢ a lb in 1981.

There were some signs of price improvement in the first quarter of 1983, coupled with general sentiment that economic conditions were improving, however slowly. But, even with another round of wage negotiations only a few months ahead, consumer demand still was leaving a lot to be desired, pricewise and volumewise. A mid-April report that one major copper producer was close to an unusual (for the copper industry) early labor agreement took some of the edge off the speculative side of things.

The aluminum producers, who also face a new round of wage bargaining this spring, spilled a lot of red ink last year and quite likely spilled more in the first quarter of 1983.

The aluminum price structure weakened a lot more than copper last year, despite steadily deeper production cuts, and some producers were finding it more advisable to purchase ingot on the open market than to reactivate idled facilities as the need (slowly) arose. Ingot prices started to improve smartly late in the first quarter, helped along by the producer buying, but was see-sawing in a narrow range as the second quarter got under way.

Prices for lead, zinc, nickel and molybdenum weakened in 1982 and were showing only faint signs of recovery in the opening months of this year.

Lower interest rates at the business level have provided some help, but demand for hard goods from autos and appliances on down isn't expected to improve until interest rates come lower at the consumer level and industry starts calling back idled workers.

This, of course, has an element of chicken-or-the-egg to it, and it is being posed against a background of rising Federal deficits that threaten the infant slide in interest rates. □

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OVERSIZE FOLDOUT(S) FOUND HERE IN THE PRINTED EDITION OF THIS VOLUME ARE FOUND FOLLOWING THE LAST PAGE OF TEXT IN THIS MICROFICHE EDITION.

SEE FOLDOUT NO 1-2

SPECIALTY STEEL: IS LONG-TERM IMPORT RELIEF JUST AROUND THE CORNER?

The industry is generally optimistic about its chances of a favorable decision from the President.

BY GEORGE J. MCMANUS

"I've really never been more optimistic," said Richard P. Simmons, president and chief executive officer of Allegheny Ludlum Steel Corp.

Mr. Simmons was speaking with reference to decisions pending on specialty steel imports. "I've never been more optimistic than I am at this time with regard to our chances of getting long-term relief."

One step toward relief was taken March 24 when the International Trade Commission (ITC) ruled that specialty steel producers had been injured by imports. On April 5, the producers asked for import quotas (*IA*, April 13) that would run for five years. The Commission's decision was due by May 6.

President Reagan will have until July 4 to act on the recommendation. Mr. Reagan has heartily endorsed the domestic industry's position. Charges of foreign subsidies are "well founded," he has said. "The injury to the domestic industry is clear."

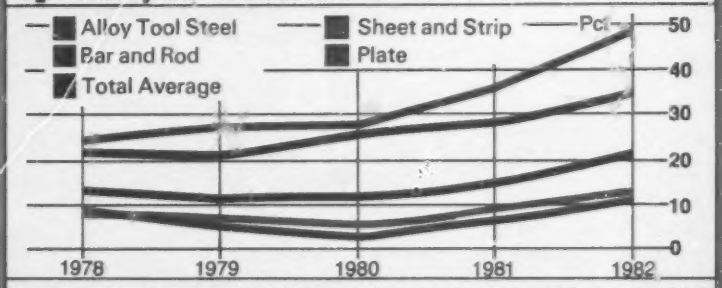
With this background, the specialty people say Mr. Reagan's decision should be favorable and prompt. "I would hope he would not wait until July 4," said Adolph J. Lena, chairman of AL Tech Specialty Steel Corp. and also chairman of the specialty industry's advisory committee.

The hopes of specialty people have been dashed before, but they are optimistic now and they are acting on this feeling. At a time when the buzzwords in steel are diversification and contraction, Allegheny Ludlum, for one, is building for a future in steel.

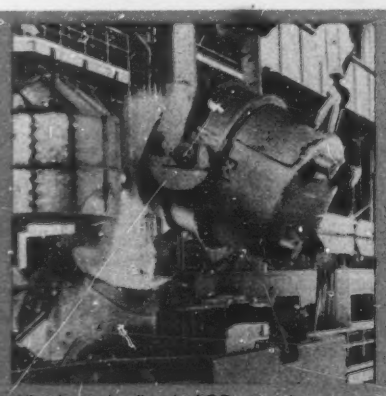
"You know we increased our R&D budget in 1982 over 1981," said Mr. Simmons. "We did it and we've made substantial progress. By the end of the year, we expect to be bottom blowing stainless steel in our BOF. Bottom and top."

This reaction is not unique. "We've held on to all our research and development," said Paul R. Roedel, president of Carpenter Technology Corp. "We

Import Penetration of the U.S. Specialty Steel Market



Source: American Iron and Steel Institute, AIS10-S (shipments), AIS Imports 2 and U.S. Department of Commerce, IM146 (imports) and EM546 (exports).



Allegheny Ludlum's AOD vessel.

U.S. Imports for Consumption of Specialty Steel

Quantity in short tons; Value in thousands of dollars

	1978		1979		1980		1981		1982	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Sheet & Strip	81,560	117,111	62,316	99,864	38,436	73,367	72,141	124,295	87,289	142,315
Plate	11,411	16,699	7,032	12,004	2,976	6,613	7,750	20,038	13,269	26,163
Bar & Rod	44,987	70,279	47,276	82,211	58,466	114,260	59,983	120,829	61,932	113,224
Total Stainless	137,958	204,089	116,624	194,079	99,878	194,240	139,874	265,162	162,490	281,702
Alloy Tool Steel	28,077	61,532	33,808	79,312	28,793*	88,574**	36,239	87,825	40,057	91,705
Total	166,035	265,621	150,432	273,391	128,671	282,814	176,113	352,987	202,547	373,407

*Data reflect downward revision of 1,096 short tons by the U.S. Bureau of the Census. **Value figures do not reflect the downward revision. Source: U.S. Department of Commerce, IM146, IM145X.

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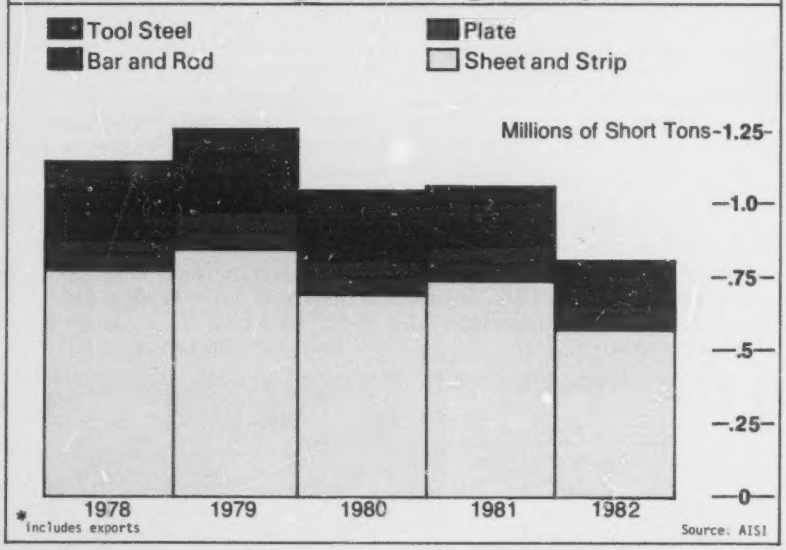
U.S. Production of Specialty Steel, by Type (Short Tons)

	Stainless Steel					Total Stainless and Alloy Tool Steel
	Sheet and Strip*	Plate	Total Bar and Rod	Total	Alloy Tool Steel**	
1978	782,922	83,333***	170,889***	1,037,144	91,816	1,128,960
1979	873,757	105,000	200,824	1,179,581	94,560	1,274,141
1980	700,240	101,000	187,485	988,725	78,655	1,067,380
1981	758,196	95,000	165,325	1,018,521	67,360	1,085,881
Jan.-Aug. 1981	558,271	63,000	106,517	727,788	45,863	773,651
Jan.-Aug. 1982	400,034	49,000	77,889	526,923	32,129	559,052

*Domestic shipments from AISI. These are estimates of production. **Domestic shipments from AISI. These data are estimates of production. ***Estimates from U.S. ITC Publication No. 1036.

U.S. Domestic Shipments of Specialty Steel*



did not reduce significantly the training areas, the alloy development, the market research and development."

Carpenter's bar mill expansion and modernization is going forward, although at a slower pace. This far-sighted approach is remarkable because 1982 was a year to try the souls and exhaust the patience of specialty people. Carpenter Technology had a loss in its fiscal year for the first time since 1933 (Carpenter did have a profit in the calendar year).

Given Carpenter's record of profitability, this showing had to mean 1982 was an incredibly bad year. "In the metals and minerals industries, it just seems to have been the absolute worst," said Mr. Roedel.

What made 1982 so bad was the combination of depressed demand and heavy imports. Shipments of stainless steel fell 23 pct in 1982. Shipments of tool steel were down 35 pct. In the same period, stainless imports were up 6 pct and tool steel imports rose 10 pct.

The net effect was that specialty imports captured 19 pct of a weak market. Individual segments of the market were inundated. Foreign producers claimed about half the tool steel and stainless rod markets.

Producers of high speed steels have been hit by the recession and by direct imports.

Also, they are being zapped indirectly by imports of cutting tools.

"Drape it in black," said Hugo G. Becker of the high speed steel situation. Cutting tools are coming in from mainland China and other unlikely places, added Mr. Becker, who is president of Braeburn Alloy Steel.

The stainless sheet and strip market has had a fairly vigorous recovery. "There's a semi-euphoria in stainless flat-rolled," said Alan M. Smith, president of Universal-Cyclops Specialty Steel.

Speaking in March, he noted that there had been three months of strong orders. He also noted that there was a spring spurt in 1982. "Then it went over the cliff. August and September dropped way back to about 50 pct of the prior months."

Similar words of caution came from Mr. Simmons of Allegheny Ludlum. "I'm worried about the fact that our business has improved faster than I expected it to," he said. The gain has been mostly in the consumer durables area. "We've called back over 400 people since the start of the year. I just don't want to see this thing be another boom or bust."

As of late March, orders of Republic Steel's Enduro Division were up 25 to 30 pct. Producing stainless sheet, strip and plate (also aerospace alloys), the division was getting more business from flatware, appliance, service center and auto companies.

Like others in the stainless sheet business, William Clark was nervous about the upturn. "The prices of raw materials are going up," said Mr. Clark, who is general manager of the Enduro Division. Customers are well aware that this could affect stainless prices, he indicates. "There may be some hedge buying."

With stainless imports up the last two years and demand down, there has been very tough pricing in sheet and strip markets.

This may explain why the import share of the flat rolled market has never reached the proportions of the bar and tool steel penetrations.

"My feeling is prices are so low there isn't too much room for imports to come in," said Mr. Clark. He noted that the Japanese have backed off Type 304 stainless sheet in the U.S.

In meeting foreign competition head-on, domestic producers have left little room for their own profits. The industry is "maybe a little foolish," said Mr. Clark.

Producers of specialty bars aren't worried about an impending boom. "The bar products area is still fundamentally a disaster," said Mr. Smith. The bar line of Universal-Cyclops includes stainless, high temperature, high speed, and tool steel alloys.

By mid-March, a few faint signs of an upturn were appearing in bar markets. "Our order entry has picked up modestly," said Dr. Lena. AL Tech makes stainless, tool steel, and high temperature alloys in bar, rod, wire and extrusion form.

"It's a little bit better," said Carl R. Moulton, marketing vice president for Jessop Steel Co. Mr. Moulton was referring to Jessop's stainless plate line. "Tool steels are still pretty slow," he said.

In Baltimore Armco is installing what may be the world's first horizontal continuous caster for specialty grades.

"We've left the bottom behind us," said R. W. Cardy, commercial vice president for Carpenter. Producing the full range of specialty bar products, Carpenter sells in markets that have been hard hit by imports. By concentrating on highly specialized products and applications, the company normally operates in areas that are largely outside the import territory.

"Carpenter tends toward the high side of the product line," said Mr. Roedel. In today's depressed market, he added, "we're having to compete against imports in some of the more commodity type products."

The stainless steel division of Armco Inc. has had some improvement in bookings. "It's nothing to write home about," said F. H. Cheffy, president of the division. Armco makes stainless bar products at Baltimore and stainless flat rolled at Butler, Pa. Mr. Cheffy is referring to bar products.

The aerospace market is in a state of flux. Demand for the high temperature jet engine alloys is being held down by the lag in commercial aircraft construction. Demand for military aircraft engines has been fairly steady, but this accounts for only about 25 pct of the high temperature market.

"It does not translate into a lot of business for us," says Mr. Smith of Universal-Cyclops. He doesn't expect the defense buildup to have much impact.

More important for high temperature alloys are commercial aircraft, which use large engines. Commercial activity is down and the advent of the Airbus has moved quite a bit of work abroad. Domestic producers, whose high temperature alloys are still specified for jets, are adjusting to this change.

The picture for aerospace structural alloys is a little different. There, defense spending is starting to create some demand. "Of all of our businesses, it's probably the firmest area," said Marshall Schober, president of Latrobe Steel Co.

"It's not back to the levels we saw in the super-heated times," said Mr. Schober. "On the other hand, some of the military programs have reached the hardware stage."

Latrobe's structural alloys go into landing gears, engine mounts, missile cases, shuttle fasteners and related components. The company's market has shifted from commercial to military dominance.

Latrobe's high speed business has been bad. "The worst I've ever seen it in my 33 years in the business," says Mr. Schober. "It's been heavily impacted, of course, with imports."

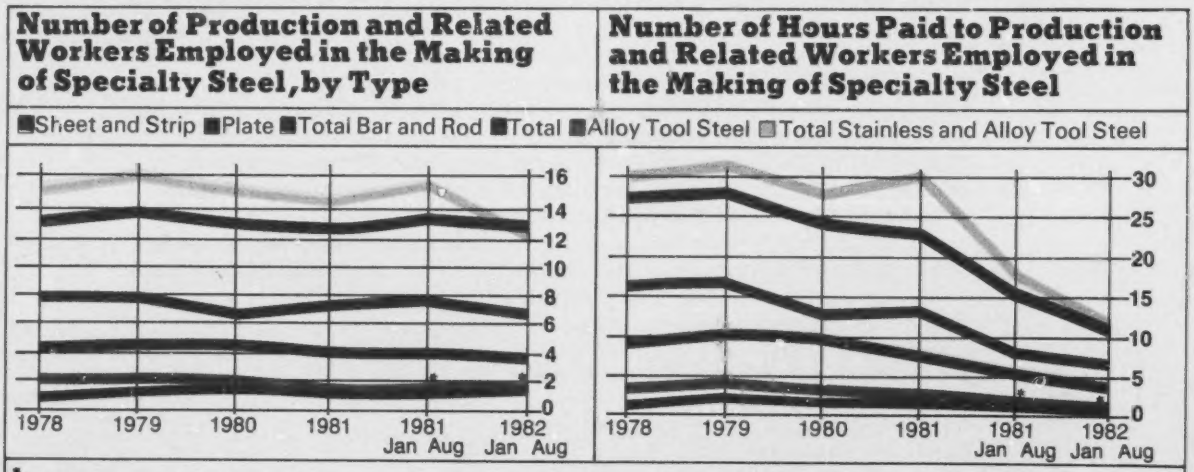
The various reports add up to a fragile recovery in the consumer markets for specialty steel and no real recovery yet in the capital goods markets. The condition of the economy has made for very strong feelings on the subject of foreign trade. Domestic producers say specialty imports must be put on a more predictable basis.

"When you look at the scope of the problem," says Dr. Lena, "the only remedy is a quota." A quantity limit is not the ideal solution, he says; it doesn't prevent unfair competition. "But it's the only manageable solution."

The specialty people have had experience with this solution. In June of 1976, quotas were established for stainless and tool steel imports. Domestic

Number of Production and Related Workers Employed in the Making of Specialty Steel, by Type

Number of Hours Paid to Production and Related Workers Employed in the Making of Specialty Steel



*Data cover period January-June.

Source: U.S. International Trade Commission Publications.

At Republic, cost cutting starts at the top

"Our initial effort was aimed at getting management's head on straight," says William Clark, general manager of Republic Steel's Enduro Division.

Mr. Clark is explaining why the division, which makes aerospace alloys and stainless flat rolled products, began its cost reduction drive at the top. Before addressing hourly workers, he indicates, the division felt it should check out the management operation.

This check has produced some interesting results. One of the task forces created by Republic recommended the elimination of a management layer. What's interesting is that two of the three task force members are from that layer.

The detachment shown in the recommendation is exactly what Enduro was after when it went to the task force approach. "We were trying to take people out of boxes on the organization chart," says Mr. Clark.

The division's target is a 25 pct reduction in the cost of sales. Working on this goal are three task groups, one for operations, one for production planning and one for marketing.

"They had to be able to write specific action plans," says Mr. Clark. There had to be procedures for measuring gains.

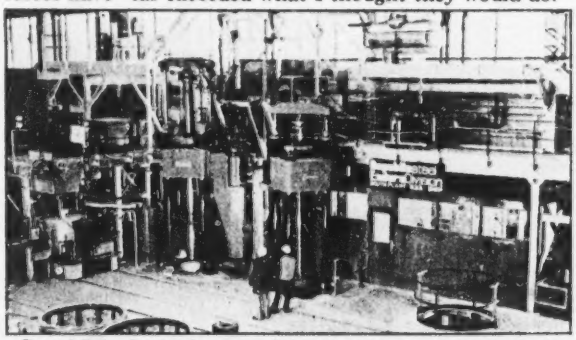
Having subjected management to objective scrutiny. Enduro extended its efforts to the bargaining unit. Part of the effort involved keeping workers posted on the financial status of the operation.

"When we're in the red, they will come up and make suggestions," says Mr. Clark. (The division is now in the black.)

Another aim is to make everyone understand the meaning of good performance. "We're trying to get our people closer to the market and the customer."

Workers have been assured that every suggestion will receive management's attention. This assurance was underlined when an idea submitted 12 years ago was acted upon with full recognition for the individual involved.

"We've seen excellent results," says Mr. Clark. The task forces have "far exceeded what I thought they would do."



Republic's electroslag remelt facility at Enduro's South Plant in Canton, Ohio which produces super-refined special metals, began a cost reduction program at the top by eliminating a layer of management.

There is now general confidence that the division will survive, he indicates. Workers are now pushing for growth, not just survival.

Mr. Clark considers this attitude remarkable for an operation where the average man has 25 years service and might be expected to coast toward retirement.

Somewhat surprisingly, the Enduro Division is just now setting up the labor-management participation teams called for in the steel contracts. Mr. Clark felt it was necessary to get through processes up and down the line on the proper wavelength before the formal participation program was launched.

producers and United Steelworkers of America had filed for relief under Section 201 of the Trade Act. This is the 'escape clause' section. It calls for trade curbs if domestic producers are being injured by imports. In theory, unfairness is not a consideration.

The quotas ran for three years and worked fairly well. Domestic producers prospered and modernized. Foreign producers complained but didn't seem too dissatisfied.

When the three-year term of the quotas expired in June of 1980, President Carter decided against an extension. Instead of killing the quotas outright, Mr. Carter announced they would be phased out over eight months.

This may have been intended as a sop to domestic producers, but the effect was entirely negative from a domestic standpoint. Although the quotas were immediately rendered useless in June of 1979, the nominal expiration date was February of 1981.

Under the law, the specialty companies could not file another 201 petition until two years after the official quota expiration. This timing was later to be critical.

The killing of the quotas left specialty people in No Man's Land just as a world steel glut was developing. The specialty grades weren't included in the trigger price system. They would be left out of the 1982 agreement which limited steel imports from Europe. Not surprisingly, specialty imports rose 32 pct to an all-time high in 1981. In December of 1981, the domestic producers and United Steelworkers of America petitioned the U. S. Trade Representative for relief under Section 301 of the Trade Act. The petition charged that imports from Brazil and six European countries were being illegally subsidized.

Section 301 permits unilateral government action against imports and it is directed specifically against subsidies. The specialty people went this route because they were still barred from Section 201 injury actions and because they wanted to address the whole import problem.

Dumping complaints and countervailing duty suits are piecemeal actions. It's like trying to shoot a flock of birds with a rifle, domestic officials say.

Section 301 permits broad action, but it has seldom been used and there was some vagueness in 1981 about its workings. The Trade Representative is supposed to confer with foreign countries and get them to eliminate abuses. If that doesn't work, the President can apply a variety of curbs, probably including quotas.

While relying heavily on the 301 case, the specialty companies and the Steelworkers followed this in 1982 with seven unfair trade suits.

These are still grinding their way through government agencies. The International Trade Commission has made preliminary findings of injury on products from Germany, Spain, Brazil, and Great Britain.

In 1982, meanwhile, the recession was deepening and the flow of imports continued. The Crucible Steel plant at Midland, Pa., was shut down. Guterl Special Steel Corp. filed for protection under the bankruptcy code.

The specialty people fumed and agitated during 1982, but nothing decisive happened until Nov. 16, the last day for action on the 301 complaint. Just prior to the deadline, there were reports that William Brock, the Trade Representative, had recommended temporary import quotas.

If that was the recommendation, it was rejected. The Administration's ac-

tion consisted of: 1. An expedited injury investigation under Section 201; 2. Talks aimed at ending abuses; 3. Monitoring of specialty imports.

President Reagan said the domestic companies were in the right but viewed from a distance, it appeared that he had simply killed the 301 complaint by coming up with a remedy that called for another investigation.

That really isn't true, said Dr. Lena. He explained that a hooker in Section 301 requires the government to offer matching concessions if it takes unilateral action against imports without a finding of injury. That doesn't sound very unilateral, but it's apparently the way things are.

There have been meaningful discussions with foreign countries on the specialty problem, said Dr. Lena, and the Administration has allowed the dumping and subsidy suits to go forward. Normally, these suits must be withdrawn when a 201 investigation is launched.

Under the 'expedited' procedure called for by Mr. Reagan, the International Trade Commission has taken about five months instead of the maximum six to come up with a recommendation. With a number of injury probes already completed, specialty people wonder why so much time was needed.

The dumping and countervailing duty cases give domestic companies some real leverage in securing a favorable remedy. The Commerce Dept. has made a preliminary ruling that German tool steel is being dumped in the U.S. by a margin of 61 pct. The British subsidy on stainless flat rolled is placed at 19 pct.

These and other findings could make quotas or some voluntary quantity limits the lesser of two evils for foreign countries. That was the case last year with carbon steel from Europe. The British have reportedly broached the subject of voluntary quotas for specialty grades.

In any case, the domestic specialty people feel they are nearing the end of a long road. While expressing optimism for their own case, they have their doubts about the legal machinery available for trade problems.

"The trade laws are simply not enforceable," said Dr. Lena. "You have to be so badly hurt before you can prove injury under the definition used that no timely response is possible."

In the specialty situation, he noted, there were three major shutdowns or financial failures before an injury determination had been made. Another flaw, he says, is that the law provides no penalty for unfair trade and no compensation for injury. The only requirement is that the foreign producer stop being unfair; no retroactive fines are levied.

The whole specialty argument for trade curbs rests heavily on the proposition that domestic mills are world leaders in process and product technology.

"Nobody's beating us," says Mr. Simmons of Allegheny Ludlum. On the basis of raw material costs, utility costs, and labor manhours, he indicates a company like Allegheny Ludlum has an edge over foreign competitors.

"We're developing the new alloys," he adds. "There are some new ones coming out of Sweden but really, most of the new alloys are United States inventions."

Dr. Lena of AL Tech cited a consultant study made purely for internal evaluation purposes. "They convinced themselves that we are the lowest cost producer in this market and we're fully competitive."

Given the technical situation, say domestic producers, there can be only one conclusion. "Since there is not technical superiority abroad," says Mr. Smith of AL Tech, "America should be able to compete very well in specialty steels.

"The only reasons there is not the apparent ability to compete is purely and simply the support those companies have gotten from their respective governments."

Domestic mills continue to modernize. At Baltimore, Armco is installing what may be the world's first horizontal continuous caster for specialty grades. Also going in at Baltimore is a GFM forge rolling mill. At Butler, Pa., Armco is 100 pct continuous casting and operates the world's largest AOD vessel.

Latrobe Steel began an extensive modernization in the Sixties. A new melt shop with three arc furnaces and a 60,000-lb vacuum induction furnace was installed in 1964. This was followed by an automated forging press and in 1968 by a continuous rolling mill.

"That was the biggest step we'd ever taken," says Mr. Schober of the mill. "Meanwhile, we were adding vacuum furnaces."

In 1975, Latrobe was acquired by the Timken Co. Under Timken, capital spending has been accelerated. Latrobe installed a new electroslag furnace last November. The company is now putting in an AOD vessel. It has installed new grinding, materials handling and testing equipment. Capacity of the wire mill has been doubled.

"In the last five years, we've spent 50 pct of our net worth," says Mr. Schober.

He has no doubts about the competitive superiority of Latrobe's plant. "There's no question in my mind. We've been through the mills in Sweden. We've got better equipment."

Carpenter's capital program has been slowed but the company still plans to spend $400 million on new facilities. The $125 million bar and wire mill is now scheduled for completion in September of 1985. A new GFM mill is being installed on schedule.

Like others in the specialty field, Carpenter has an active powder metallurgy program. Mr. Roedel sees a place for powder but he doesn't look for a wholesale displacement of conventional processing.

"If you can do it by melting, rolling and forming efficiently," he says, "that's the way to go. If you can't do it efficiently, that's where the powder process has got to be. I think the next 10 years will see more and more powder coming into more and more applications."

Universal-Cyclops reports good progress in getting its CAP powder process qualified for aerospace programs. (Consolidation by Atmospheric Pressure). It takes time to get a new product accepted, says Mr. Smith, because of the long gestation period of a new jet engine. The opposite side of this coin is that domestic alloys aren't likely to be dislodged from jet engines very soon.

AL Tech has installed two AOD vessels at its Dunkirk, N.Y., plant. This has made it possible to shut down the two smaller of four electric furnaces.

Universal Cyclops has launched productivity programs throughout its operations. One such program, CARE (Cooperation, Awareness, Responsibility and Efficiency) blends worker-management commitment to improving production techniques.

"When we had four furnaces in there before AOD," said Dr. Lena, "that melt shop had a rated capacity of 6,500 tons a month. Now, we can produce 12,000 tons a month with fewer people."

A number of the specialty mills have been taking advantage of the slack times to push for worker productivity. Universal-Cyclops launched a productivity program during a three-month shutdown of its Bridgeville, Pa., plant at the tail end of 1982.

The program included a formal presentation on the importance of cost and quality. This was followed by meetings of management with small groups throughout the plant. As the plant was restarted, production results were compared with prior periods.

"Initial indications are there is a 25 to 30 pct improvement," says Mr. Smith. Direct, candid communications by management is essential in this kind of effort, he indicates.

At the Enduro Division of Republic Steel, task forces have started at the top and are working downward in a program that is shooting for a 25 pct cost reduction. (See Box).

A major restructuring of the specialty steel industry was indicated when the Midland, Pa., plant of Crucible Steel was acquired by Jones & Laughlin Steel Corp.

The plant had been shut down by the former owner, Colt Industries, after sustaining large losses. A proposed acquisition by Cyclops Corp. fell through.

On Nov. 24 of 1982, the sale of Crucible to J&L was finalized. J&L said it would hire 250 to operate the electric furnaces, the AOD vessel and the continuous caster at Midland. This is a far cry from the 2,000 who had been employed at the plant, but there is speculation that J&L will eventually consolidate all its stainless melting at Midland.

Although terms have never been disclosed, it's believed United Steelworkers have agreed to sweeping contract concessions at Midland. This came up during contract negotiations of the eight steel companies which bargain jointly.

Richard P. Simmons, president of Allegheny Ludlum Steel Corp., registered unhappiness at the concessions negotiated by J&L at Midland. Allegheny Ludlum is a leading stainless producer and competes with J&L in that market.

The upshot was that Allegheny Ludlum departed from the joint group and negotiated its own contract. □

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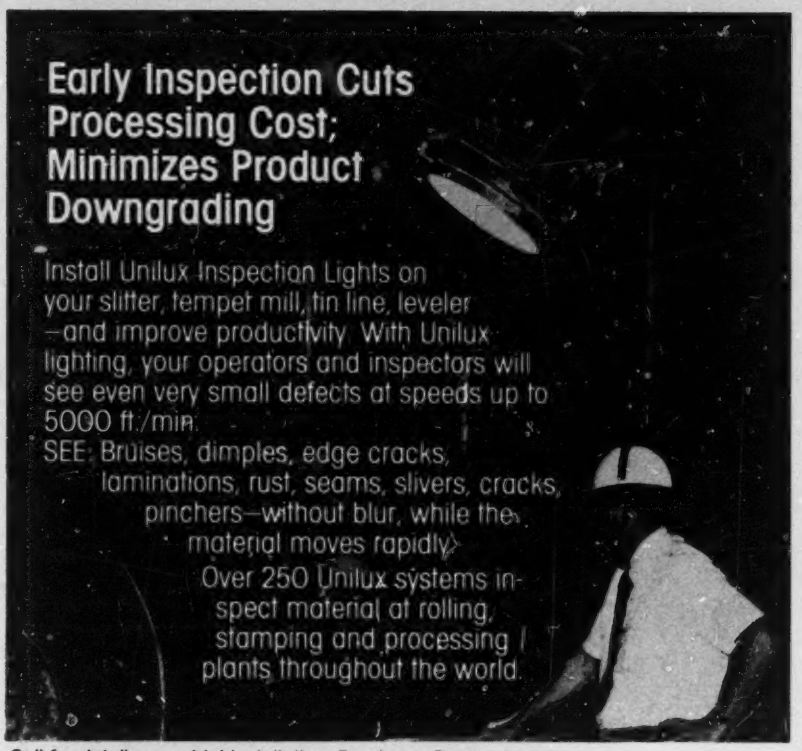

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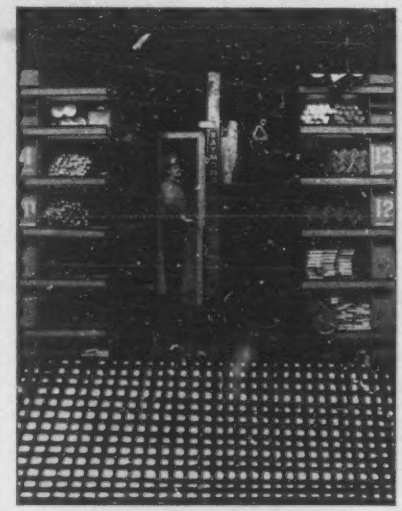
IRON AGE

MAY 11, 1983



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23 SERVICE CENTERS ARE TAKING STOCK IN THE RECOVERY
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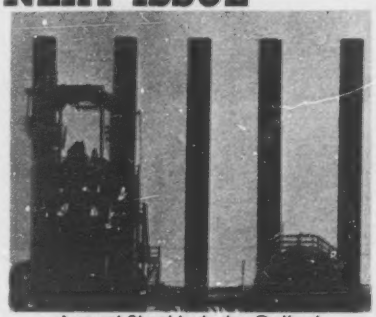

Annual Steel Industry Outlook

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EFFECTIVE APRIL 25, 1983

MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Steel Production, Composite Prices

(Effective April 25, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,720	1,687	23,919	27,647
Capability Utilization Rate	59.5	58.4	51.1	58.1

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.862
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 70.83	$ 70.83	$ 71.17	$ 71.83
No. 2 bundles	$ 48.50	$ 48.50	$ 49.17	$ 47.83
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 75.50	$ 75.50	$ 75.50	$ 76.50
No. 1 steel, Philadelphia	64.50	64.50	65.50	71.50
No. 1 steel, Chicago	72.50	72.50	72.50	67.50
No. 1 bundles, Detroit	72.50	75.50	75.50	67.50
Low Phos., Youngstown	69.50	69.50	69.50	83.50
No. 1 mach'y cast., Pgh	76.50	76.50	76.50	86.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	113.50
No. 1 mach'y cast., Chi	110.50	110.50	110.50	119.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Nonferrous Prices

(Effective April 25, 1933)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	81.50-82.00	80.00-82.00	4/22/83
Lead	21.00-23.00	20.50-23.00	3/30/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	38.00	38.00-40.00	3/29/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.55-$1.60
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $441.50
Indium, dollars per troy oz. $3.10
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$320-$335
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $12.30
Vanadium $4.94
Zirconium sponge ..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Apr. 18—624.90 Apr. 21—622.35
Apr. 19—666.51 Apr. 22—621.65
Apr. 20—622.06

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	75½	66¼
Yellow brass	63⅝	61¼
Red brass	69¼	66⅛
Comm. bronze	70⅞	67¾
Mang. bronze	62¼	60½
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	71
No. 2 copper wire	63
Light copper	54

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	67
No. 2 copper wire	59
Light copper	50
No. 1 composition	55
No. 1 comp. turnings	50
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	28
Radiators	44

Aluminum

New mixed clips	36	—37
Old sheet	35	—36
Old cast	35	—36
Clean dry borings	35	—36

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	27	—28
Mixed L.C. clips	24	—25
Old sheets and cast	19	—20
Borings and turnings	13	—14
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	58	—59
No. 2 copper wire	51	—52
Light copper	44	—45
Radiators	37	—38
No. 1 composition	46	—47
No. 1 composition turn'gs	42	—44
Cocks and faucets	32	—33
Clean heavy yellow brass	31	—32
Brass Pipe	31	—32
New soft brass clippings	46	—47

Lead

Heavy soft lead	10	—11
Whole batteries	4	— 5
Type metal	15	—16
Electrotype	17	—18

Nickel

Nickel solids	95	—100
Nickel rod ends	95	—100
Nickel sheets, clips	95	—100
Nickel turnings	45	— 50

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

EFFECTIVE APRIL 25, 1983

MATERIALS NEWSFRONT

(Effective April 25, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 75.00 to	$ 76.00
No. 2 hvy. melting	70.00 to	71.00
No. 1 dealer bundles	83.00 to	84.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	83.00 to	84.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	28.00 to	29.00
Cast iron borings	27.00 to	28.00
Low phos. punchings plate	91.00 to	92.00
Heavy turnings	70.00 to	71.00
No. 1 RR hvy. melting	85.00 to	86.00
Rails 2 ft. and under	96.00 to	97.00
Scrap rails, random lgth.	88.00 to	89.00
RR specialties	93.00 to	94.00
No. 1 machinery cast	76.00 to	77.00
Cupola cast	69.00 to	70.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	590.00 to	600.00
18-8 turnings	490.00 to	500.00

Chicago

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	61.00 to	62.00
No. 1 dealer bundles	84.00 to	85.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	49.00 to	50.00
No. 1 busheling	79.00 to	80.00
Shredder scrap	75.00 to	76.00
Machine shop turn.	17.00 to	18.00
Mixed bor. and turn.	18.00 to	19.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	40.00 to	41.00
Low phos. forge crop	89.00 to	90.00
Low phos. punchings plate ¼ in. and heavier	96.00 to	97.00
Low phos. 2 ft. and under	90.00 to	91.00
No. 1 RR hvy. melting	79.00 to	80.00
Scrap rails, random lgth.	71.00 to	72.00
Reroller rails	96.00 to	97.00
Rails, 2 ft. and under	93.00 to	94.00
RR couplers and knuckles	81.00 to	82.00
RR car axles	104.00 to	105.00
No. 1 machinery cast	110.00 to	111.00
Cupola cast	95.00 to	96.00
Stove plate	94.00 to	95.00
Steel car wheels	82.00 to	83.00
Stainless		
18-8 bundles and solids	550.00 to	560.00
18-8 turnings	450.00 to	460.00
430 bundles and solids	135.00 to	140.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	$ 63.00 to	$ 66.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	74.00 to	77.00
No. 2 dealer bundles	43.00 to	46.00
No. 1 busheling	74.00 to	77.00
Shredder scrap	73.00 to	76.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	43.00 to	46.00
Low phos. 5 ft. and under	73.00 to	76.00
Low phos. 2 ft. punchings	91.00 to	94.00
Electric furnace bundles	95.00 to	98.00
RR specialties	80.00 to	83.00
Rails, 2 ft. and under	93.00 to	96.00
Cupola cast	60.00 to	63.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 49.00 to	$ 50.00
No. 2 hvy. melting	47.00 to	48.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	69.00 to	70.00
Drop forge flashings	44.00 to	45.00
Machine shop turn.	27.00 to	28.00
Mixed borings and turn.	13.00 to	14.00
Shoveling turnings	27.00 to	28.00
Cast iron borings	13.00 to	14.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	480.00 to	490.00
18-8 turnings	360.00 to	370.00
430 bundles and solids	120.00 to	130.00

Youngstown

No. 1 hvy. melting	$ 62.00 to	$ 63.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	69.00 to	70.00
Electric furnace bundles	70.00 to	71.00
Galvanized bundles	60.00 to	61.00

Cleveland

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	74.00 to	75.00
No. 1 factory bundles	81.00 to	82.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	74.00 to	75.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	92.00 to	93.00
Low phos. punchings plate	92.00 to	93.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	96.00 to	97.00
Rails, 18 in. and under	97.00 to	98.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	89.00 to	90.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	305.00 to	315.00
18-8 turnings	255.00 to	265.00
430 bundles	80.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 busheling	38.00 to	39.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.	9.00 to	10.00
Mixed bor. and turn.	16.00 to	17.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	15.00 to	16.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	50.00 to	51.00
Scrap rails, random lgth.	30.00 to	31.00
No. 1 machinery cast	71.00 to	72.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 61.00 to	$ 62.00
No. 2 hvy. melting	50.00 to	51.00
Foundry steel, 2 ft.	50.00 to	51.00
No. 1 dealer bundles	61.00 to	62.00
No. 2 bundles	47.00 to	48.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	61.00 to	62.00
Rails, random length	61.00 to	62.00
Rails, 18 in. and under	76.00 to	77.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	82.00 to	83.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	96.00 to	97.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 64.00 to	$ 65.00
No. 2 heavy melting	59.00 to	60.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	64.00 to	65.00
Shredder scrap	77.00 to	78.00
Machine shop. turn.	24.00 to	25.00
Shoveling turnings	35.00 to	36.00
Cast iron borings	35.00 to	36.00
Electric furnace bundles	64.00 to	65.00
Elec. furnace, 3 ft. & under	59.00 to	60.00
Structural and plate, 2 ft.	79.00 to	80.00
Structural and plate, 4 ft.	77.00 to	78.00
No. 1 RR hvy. melting	63.00 to	64.00
Scrap rails, random lgth.	68.00 to	69.00
Rails, 18 in. and under	86.00 to	87.00
Angles and splice bars	76.00 to	77.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	56.00 to	60.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 51.00 to	$ 52.00
No. 2 hvy. melting	48.00 to	49.00
No. 1 dealer bundles	57.00 to	58.00
No. 2 bundles	30.00 to	31.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	9.00 to	10.00
Cast iron borings	11.00 to	12.00
Low phos. 18 in. and under	76.00 to	77.00
Rails, random length	58.00 to	59.00
Rails, 2 ft. and under	78.00 to	79.00
No. 1 cupola cast	62.00 to	63.00
Heavy breakable cast	28.00 to	29.00
Drop broken cast	69.00 to	70.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	480.00 to	500.00
18-8 turnings	375.00 to	390.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	40.00 to	42.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	40.00 to	42.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 43.00 to	$ 45.00
No. 2 hvy. melting	35.00 to	37.00
No. 1 dealer bundles	30.00 to	32.00
No. 2 dealer bundles	14.00 to	16.00
Machine shop turn.	6.00 to	8.00
Cast iron borings	6.00 to	8.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 42.00 to	$ 44.00
No. 2 hvy. melting	31.00 to	33.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	11.00 to	13.00
Machine shop turn.	6.00 to	8.00
Shoveling turnings	10.00 to	12.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under (foundry)	86.00 to	88.00
No. 1 cupola cast	88.00 to	90.00

Seattle

No. 1 hvy. melting	$ 61.00 to	$ 63.00
No. 2 hvy. melting	50.00 to	52.00
No. 2 bundles	40.00 to	42.00
No. 1 cupola cast	94.00 to	96.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:	
No. 1 heavy melting	$ 55.00
No. 2 heavy melting cut 2 ft. and under	52.00
No. 1 dealer bundles	60.00
No. 2 bundles	30.00
Mixed steel scrap	34.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	25.00
Short steel turn.	28.00
Mixed bor. and turn.	15.00
Cast scrap	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	53.00 to	55.00
No. 2 bundles	36.00 to	38.00
Machine shop turn.	20.00 to	21.00
Crushed turnings	36.00 to	38.00
Shredder scrap	69.00 to	70.00
Cut structural plate 2 ft. and under	86.00 to	88.00
Unstripped motor blocks	60.00 to	62.00
Cupola cast	72.00 to	74.00

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Chilton's

MAY 20, 1983

IRON AGE

THE MAGAZINE FOR METALWORKING MANAGEMENT

C 2150 - 2 5/25/83

DAVID M. RODERICK,
Chairman, U.S. Steel

"I am convinced of this: every ton of steel entering the United States today is being dumped. They (imports) contaminate the market. They poison the well."

The recession is "stretching companies on the rack and it falls unequally. There isn't any specific period of time where everybody [illegible]s off a cliff."

THOMAS C. GRAHAM,
Vice Chairman, U.S. Steel

ANNUAL STEEL OUTLOOK

[illegible]RATIONALIZING' THE FUTURE

MANUFACTURING SYSTEMS SERIES 40:
GROUP TECHNOLOGY—INDUSTRY'S POTENT WEAPON IN THE PRODUCTIVITY BATTLE

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VOL. 226, NO. 15

IRON AGE

MAY 20, 1983

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A talk with steel's top men about the impact of imports, modernization and the labor-management relationship.

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A wrench bearer asking, "What's wrong?," won't help maintain hi-tech industries. What's needed are sound training programs.

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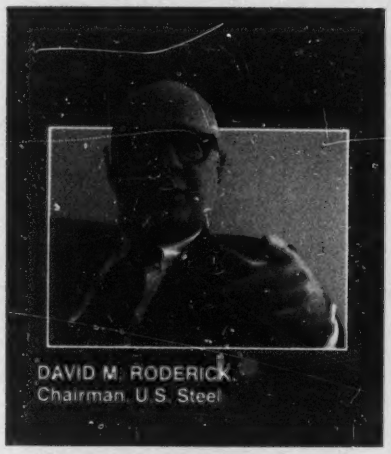

DAVID M. RODERICK,
Chairman, U.S. Steel

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STEEL, NONFERROUS ARE LOOKING FOR AN UPTURN

The lingering recession erased metal industry profits in the first quarter.

BY GEORGE J. MCMANUS AND ROBERT J. REGAN

Steel

The first quarter of 1983 was another disaster for steel mills.

The combined loss of the seven largest mills was nearly $600 million. That compared with a combined loss of $31 million in the first quarter of 1982.

Part of the profit decline could be explained by a drop in steel shipments—from 17 million tons in the first quarter of 1982 to around 15 million tons in the first quarter of this year.

However, the 13 pct shipping slide produced a 27 pct decline in the dollar sales of the seven companies. Because of diversification, steel shipments and dollars do not necessarily go together.

In this case, however, the gap between tonnage and dollar changes is not misleading. Price deterioration was a major factor in the profit deterioration.

Out of 21 steel companies checked, only four made money in the first quarter. Carpenter Technology Corp., which lost money in 1982 for the first time since the 1930s, bounced back to a $7.2 million profit in the first quarter of the calendar year.

Nucor Corp., Laclede Steel Co. and Interlake Inc., were profitable in the first quarter.

United States Steel Corp. had a net loss of $118 million in the first quarter. This reflected a drop in the operating income of Marathon Oil from $211 million in the first quarter of 1982 to $3 million in the first quarter of 1983. U. S. Steel expects the stabilizing of oil prices to bring better margins for Marathon in subsequent periods.

The steel segment of U. S. Steel had an operating loss of $232 million in the first quarter. That was down from a loss of $368 million in the fourth quarter of 1982. Wage concessions under the new labor contract began to take effect in March.

Bethlehem Steel Corp. lost $175 million in the first quarter compared to $66.7 million in the first quarter of 1982. Bethlehem's steel segment had an operating loss of $96 million in the first quarter. Despite this, the company was able to increase cash $46 million in the quarter.

Armco Inc., which made money in early 1982, lost $128 million in the first quarter of 1983. Armco's operating loss was down from the fourth quarter of 1982. The company's carbon steel business had the biggest deficit in the 1983 quarter, but there were also losses in financial services and oil field equipment. Specialty steels were profitable.

The net loss of National Steel Corp. was trimmed to $35.4 million in the first quarter, down from $40 million in the first quarter of 1982. The operating loss of National's steel business was $29 million, down from $72 million in the first quarter of 1982. National made money on aluminum and other non-steel businesses.

LTV Corp. had an operating loss of $87 million on steel in the first quarter of 1983. LTV's net loss was $77 million, down from a profit of $20 million in the first quarter of 1982.

Republic Steel Corp. had a net loss of $34 million and an operating loss of $51 million.

Among the seven largest companies, the $19.9 million net loss of Inland Steel Co. was the smallest. With its strategic location, Inland's shipments were down only 2 pct in the first quarter from the first quarter of 1982. The company's operations reached the break-even point in March.

Inland noted that changes in vacation and other fringe benefits improved results by 21¢ a share in the first quarter. In the second quarter, all the large steel companies will be getting the full benefit of wage cuts that took effect March 1.

There will also be higher volume. Shipments will go from a little over 15 million tons in the first quarter to something over 18 million tons in the second quarter.

The selective market recovery has hit individual mills differently, however. Sheet producers were operating around 70 pct of capacity by the end of the first quarter. Seamless pipe production was down around 20 pct. Plate and structural mills were probably running at no more than 40 pct.

The industry as a whole operated at 50 pct in the first quarter. By the end of April, operations were up to nearly 60 pct of capacity.

Laclede Steel, which makes bar and rod products, had an impressive comeback, going from a loss of $3 million in the first quarter of 1982 to a profit of $1.36 million in the 1983 quarter.

"At present, the industry is operating at approximately 60 pct of capacity," said John B. McKinney, president. "Laclede however, is operating at close to 80 pct . . ." Mr. McKinney attributed this high level "to the versatility of our finishing mills and a continuing, intensive sales effort."

Nonferrous

The nonferrous metals industries weren't exactly celebrating the end of the recession during the first quarter of 1983.

Early signs of recovery, like a better tone to some metal prices, lower interest rates, improvement in the housing sector and other faint glimmerings, were more than offset by the hangovers from a wretched 1982.

Prices for copper and aluminum have shown varying degrees of improvement since late in the first quarter, as have free market quotations for nickel. But there still is no great rush by fabricators to rebuild depleted inventories, beyond some nibbling here and there to build up a little insurance against higher prices and the possibility of work stoppages when major wage contracts expire over the next several weeks.

Producer stocks of aluminum and copper, although in a downtrend, still are plentiful enough worldwide to assuage consumers' anxieties, however.

The U.S. copper producers, who had put the brakes on production sharply during most of 1982, managed to nudge their prices higher during the first quarter. The uptrend has continued into the current period, despite an early settlement on a new wage pact by Kennecott Copper Corp., a major producer. The producers' price structure during the first quarter was bedeviled by a persistent rise in Comex and London Metal Exchange warehouse stocks. But the gains, marked after news of the Kennecott settlement, have been interpreted as recognition of some underlying strength that could become more ap-

Steel: Off to a Slow Start

Millions of Dollars		Earnings			Sales		
	E/S Pct	1st Qtr. '83	1st Qtr. '82	Pct Change	1st Qtr. '83	1st Qtr. '82	Pct Change
USS	—	(118.00)	80.00	—	3,860.00	5,003.00	−23.0
Bethlehem	—	(175.20)	(66.70)	—	1,119.30	1,564.80	−28.0
Armco	—	(128.40)	17.70	—	987.90	1,648.60	−40.0
LTV	—	(77.20)	20.30	—	898.90	1,591.40	−44.0
National	—	(35.40)	(40.23)	—	777.66	815.53	−4.6
Inland	—	(19.99)	(18.97)	—	695.55	763.42	−8.9
Republic	—	(34.80)	(18.80)	—	573.50	880.40	−35.0
Total	—	(588.99)	(26.70)	—	8,912.81	12,267.15	−27.0
Cyclops	—	(2.49)	(4.33)	—	223.15	201.57	+11.0
Interlake	0.4	0.88	2.80	−69	197.90	205.70	−3.8
Wheel.-Pgh.	—	(23.88)	13.64	—	172.72	216.67	−20.0
Kaiser	—	(9.90)	15.90	—	134.30	217.60	−38.0
Nucor	2.9	3.50	4.50	−22	119.70	133.10	−10.0
Carpenter	6.6	7.28	9.77	−25	109.86	125.48	−12.0
Lukens	—	(4.47)	0.96	—	81.22	87.35	−7.0
Copperweld	—	(5.20)	3.28	—	72.77	135.72	−46.0
Quanex	—	(4.26)	6.93	—	61.92	120.71	−49.0
CF&I	—	(17.86)	4.79	—	58.51	144.19	−59.0
Florida	—	(1.15)	(1.70)	—	58.04	63.31	−8.3
Laclede	—	1.37	(3.17)	—	46.04	53.99	−15.0
Eastmet	—	(2.52)	(3.70)	—	40.93	49.30	−17.0
Phoenix	—	(5.46)	4.30	—	27.69	51.11	−46.0

Nonferrous: Few in the Plus Column

Millions of Dollars	Earnings			Sales and Other Revenues		
	1st Qtr. '83	1st Qtr. '82	Pct Change	1st Qtr. '83	1st Qtr. '82	Pct Change
Alcan	(12.0)	12.0	—	1,245.0	1,236.0	+ 0.7
Alcoa	(14.3)	43.8	—	1,142.2	1,205.8	− 5.3
Amax	(48.7)	(5.8)	—	612.7	736.2	−16.8
Asarco	16.2	(1.4)	—	352.7	353.3	− 0.2
Cominco	(19.0)	(15.0)	—	264.7	265.3	− 0.2
Engelhard	16.2	14.3	+13.6	611.4	435.9	+40.3
Freeport McMoran	21.1	26.5	−20.4	204.2	194.9	+ 4.8
Homestake Mining	12.5	2.4	+418.7	67.7	52.7	+28.5
Inco	(76.9)	(37.2)	—	286.2	397.7	−28.0
Kaiser Aluminum	(28.8)	(24.9)	—	644.4	766.3	−15.9
Martin Marietta	13.8	15.8	−12.7	801.9	784.5	+ 2.2
Newmont Mining	18.8	11.8	+59.3	155.7	191.9	−18.9
Noranda Mines	(7.3)	(18.3)	—	677.0	735.0	− 7.9
Olin	22.5	22.0	+2.3	473.1	499.7	− 5.3
Oregon Metallurgical	0.05	4.2	−98.8	7.1	19.5	−63.6
Phelps Dodge	(3.9)	(19.1)	—	246.0	278.3	−11.6
Revere	(0.9)	(7.8)	—	121.5	152.9	−20.5
Reynolds	(52.4)	13.6	—	746.9	749.0	− 0.2
Sherritt Gordon	2.5	0.5	+400.0	67.7	78.9	−14.2
Vulcan Materials	(0.03)	9.8	—	154.6	164.3	− 5.9

( ) denotes loss

Alcoa: Net for 1982 period includes $19.9 million extraordinary gain from exchange of stock for debentures. **Asarco, Inc.:** Results for 1983 period include a pre-tax credit of $14.7 million for foreign currency translation adjustments compared with $15.8 million for the 1982 period. Results for the 1982 period also include pre-tax income of $7.4 million from sale of rights to purchase common stock of M.I.M. Holdings, Ltd. **Cominco Ltd.:** Canadian funds. **Homestake Mining Co.:** Net for the 1983 period includes a $5.8 million write-off of investment in a uranium mine. **Noranda Mines Ltd.:** Canadian funds. **Reynolds Metals Co.:** Net for the 1982 period includes $26.8 million credit for cumulative effect on prior years of an accounting change. Sales for 1982 period are restated. **Sherritt Gordon Mines:** Canadian funds.

parent as the recovery continues.

Asarco, Inc. credited its move back into the black in the first quarter to cost-cutting and productivity-improving measures taken last year, as well as to better copper and silver prices. Phelps Dodge Corp. said it would have been profitable except that losses from the uranium division and interest expense and other corporate charges offset small operating profits from the primary metals and manufacturing divisions.

Amax, Inc., noted that depressed prices and weak demand for molybdenum, plus lower prices for primary aluminum, more than offset the benefits from higher silver and copper prices.

North America's four aluminum giants had an aggregate net loss of $107.5 million in the first quarter on a 4.5 pct drop in aggregate sales, to $3.78 billion. In the initial 1982 period, the quartet had aggregate net income of $44.5 million, including Kaiser Aluminum & Chemical Corp.'s $24.9 million loss. Aluminum Co. of America (Alcoa) said it was looking for a gradual, but steady recovery in key aluminum markets this year, but was reluctant to predict a return to profitability in the current period. The company said the incoming order rate had improved, but part of this was inventory rebuilding.

Alcan Aluminum, Ltd., said the improvement in ingot prices that developed earlier in the year should be reflected in second quarter results.

Reynolds Metals Co. said the first quarter pickup in order and shipment rates was not enough to counter the effects of low prices and continuing cost pressures. The company said there has been a real improvement in aluminum consumption, but it was difficult to determine how much of the increased shipping volume reflected hedge buying, normal inventory rebuilding and a better chew-up rate.

Kaiser Aluminum said the recent improvement in demand and prices won't return the company to profitable operations in the current quarter, but there will be considerable improvement in operating results.

Inco, Ltd., said it was not expecting profitable operations in the current period, but results "will be substantially better" than in the first quarter. The company said startup costs will be modest by comparison to the heavy shutdown costs experienced in the first quarter and higher nickel prices also will help. □

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the distributors, Mr. Gale says.

Machine tools, like so many other businesses, are evolving into part of a growing world market. Never again are we likely to know that time when machine tool building, or many other industries, was segmented along strict national boundaries.

By the same token, distributors also can sell flexible manufacturing systems and machining cells. "Not because machine tool distributors suddenly have become doctoral candidates in engineering," says Mr. Gale. "Machine tool distributors can sell flexible manufacturing systems because they are salesmen."

If the reward is sufficient, he says, distributors will assume the responsibility, learn the basics of the product, and sell whatever flexible manufacturing system the builder can devise.

"The way we look at it, manufacturers are marketing partners with their distributors. And in any partnership, two-way communication is a key ingredient for success," says Leonard A. Newblom, vice president and general manager, Power Transmission Sales Div., Dana Corp., Toledo, Ohio. "By mutually communicating their business and marketing objectives, the distributor and the manufacturer can work toward common goals, jointly assisting each other in developing specific markets.

As marketing partners, he says, the distributor and the manufacturer must jointly develop the marketing plan. Traditionally, the manufacturer gathered information at the user level and prepared the plan. But in recent years, more distributors have expanded their roles beyond selling—into marketing.

"The distributor is in the best position to gather this marketing information, because he is more intimately involved with the market on a day-to-day basis," says Mr. Newblom. "It's the distributor's job to know the territory—to understand his customers—and to determine how the end-user wants to be served. Then it becomes the manufacturer's job—and responsibility—to see that his company is oriented so that the end-user is best served."

Market information is vital to a manufacturer. It can help to improve current product design as well as open up new market segments, applications and other sales opportunities, the Dana executive says.

John Komives, executive secretary, Central States Industrial Distributors Association (CSIDA), Milwaukee, says many manufacturers now have skeleton sales forces. A regional manager handles from one to a dozen or more distributors in each of several states.

Besides selling, he says distributors offer guidance in terms of applications engineering. "The manufacturer can use an industrial distributor to expand the market share, because he has the product where it's needed, when it's needed. Because the distributor is in the front line, he is more quickly aware of the changing or developing needs in the market place as they evolve. He also has the people and the local entries into current and new markets and emerging markets. Therefore, the manufacturer's sales are multiplied by the distributor's efforts through the distributor sales force, Mr. Komives says.

"From a financial standpoint, the industrial distributor offers some distinct advantages and opportunities to the manufacturer," adds Mr. Magoni, of

For many years, the distributor suffered the old 'middleman bogey.'

Dana's Fluid Power Div. The distributor, he explains, takes title to the goods he sells to his customers and relieves the manufacturer of an important part of the risk. The manufacturer can concentrate more of his capital in improving his products and productivity rather than tying it up in inventory.

Also, the manufacturer doesn't have to become involved in the many thousands of accounts that buy the products nationwide. In many cases, it would be totally impractical for manufacturers to sell small quantities of products to individual customers over large geographic areas.

The distributor buys inventory and becomes the field inventory for both supplier and end user, says CSIDA's Mr. Komives. And because they are closer to the market, they are better able to forecast market needs.

Also, the distributor "obtains feedback information on products and feeds this back to the manufacturer in a much less expensive way than the manufacturer ever could," he says.

Further, the local distributor is "immobile." He's not looking to move up in some large corporation's hierarchy. He's part, permanently, of the community he sells in. "The purchasing agent or president of a company gets to know his distributor personally. The distributor gets very upset if something (product reliability, for example) disturbs that relationship," says Mr. Komives.

"Manufacturers can strengthen the marketing partnership by allowing some flexibility in their relationship," says Dana's Mr. Newblom.

Distributor-manufacturer relationships are unique. Each distributor has its own style of operation that works best for it and its customers. For example, some distributors want joint sales calls, others don't. Some want the manufacturer to take care of the price books and some don't. If the manufacturer can accommodate these differences, it can enhance the partnership substantially.

"The question of who in the marketing partnership sells the OEMs, the distributor or the manufacturer, is the one that has to be answered on a case-by-case basis. Ultimately, the answer has to be based on making sure the customer is taken care of in the best way.

"A decade or so ago, it was standard practice for technical products to be sold directly to OEMs by the manufacturer. This is no longer the case, and many distributors today have a high level of technical competence that just didn't exist years ago. Because of this increasing level of expertise among distributors, we have to look very closely at who sells the OEM in each of our distributor arrangements," explains Mr. Newblom.

Distribution is also becoming more and more professional. Texas A&M is the most well known of those few schools that offer a degree in industrial distribution. "We started this curriculum 25 years ago. It's the fastest growing area in the college of engineering," says Associate Professor Gerald A. Stone.

Texas A&M offers a bachelor of science in industrial distribution, a BSID, or "ID" as it is known on campus.

Why is it the fastest growing major in the college? "Because they are so highly desirable in both manufacturing as well as distribution," says Prof. Stone.

One of the largest industrial distributors in the U.S. is Bearings, Inc., Cleveland. Says Thomas L. Bradley, its vice president, sales and marketing, "We talk in the vernacular of the industry. We look at our salesmen as problem solvers. We're dedicated to getting our customers out of the inventory business.

"The role of distribution, as dictated by the requirements of a cost-conscious industry in transition, is swiftly being rewritten. Proximity of inventory to the user's place of business has new significance," Mr. Bradley adds. "Every manufacturer is faced with the pressing need to optimally control stores, production and in-process parts. Reliability of their suppliers, both financially and in performance, is of prime importance."

For many years, the distributor suffered the old "middleman bogey." He

had to pass through unproductive toll gates set up by processors, warehousers and advertisers, a Shylock who extracted his pound of flesh without providing a commensurate service. And perhaps this was true to some extent, for the distributor of 50 or 60 years ago lacked the sophistication and the technical know-how to provide the many services he makes available today, Mr. Bradley explains.

"Still, he was a necessary, even vital cog, in the growth of industrial America, contributing to the mass production society that enabled the American consumer to obtain goods at prices far better than their European counterparts. He could consolidate the smaller purchases of a number of his customers into a larger order that would enable the manufacturer to produce at a lower unit cost. He was local, right there in your town or neighborhood with product on the shelf ready for your immediate use. And if it cost a little more, what difference. It was there when you needed it," the Bearings, Inc., executive says.

What about the costs? Where is the value-added that distributors claim they offer? Mr. Bradley says there are four principle contributions a distributor makes in reducing the consumer's cost: Investment, service, training and know-how.

Investment means having the product available when the customer needs it.

Getting the product to the customer when he wants it is service.

"A good distributor reacts to his customers' needs," says Mr. Bradley. "He pulls out all stops to respond to an emergency, a breakdown. Whatever it takes. He delivers it to the plant in the company truck, a company car, a personal car or whatever is available. If he doesn't have it, he gets on the phone, checks his other warehouse or the manufacturer. He gets it on a bus or on a plane. He gets up in the middle of the night to handle those crises that occur in the wee hours so that the morning shift can resume production."

The distributor also passes on the technical skills, the training aspect. A good distributor conducts training seminars about the product in the consumer's plant or at a central meeting.

"He holds open houses in his store to display the variety of his products. He keeps the customer supplied with the most current factory catalogues, literature and price lists. He advises of pending price changes. He introduces new products. He evaluates new products and maintains a close rapport with the manufacturer. He participates in distributor associations to improve the manufacturer's products and services

Distributors—High Sales Volumes, Less Labor

Workforce (Number of Employees)		All	Small	Medium	Large
Total Workforce		42.6	13.6	29.0	11.3
Warehouse & delivery	Men	7.5	2.2	5.3	18.5
	Women	.6	.1	.2	1.9
Outside salesmen	Men	10.0	3.2	6.0	26.0
	Women	.2	.1	.1	.7
Inside salesmen	Men	5.5	1.8	4.1	13.1
	Women	.8	.3	.8	2.2
Office employees	Men	3.2	1.1	2.0	8.0
	Women	7.9	1.8	5.3	20.6
Executive & Management	Men	4.2	1.7	3.2	9.6
	Women	.5	.2	.3	1.0
Others (including service & Mfg.)	Men	2.1	1.1	1.6	4.5
	Women	.1	.1	.1	.2
Sales Volume per Employee		$154,973	$123,725	$150,457	$151,716

Averages are based on reporting companies only

	All	Small	Medium	Large
Machine Tools	$1,414,940	$365,300	$971,552	$2,587,448
Wholesale Hardware	$2,788,993	$ 60,000	$564,887	$6,579,986
Welding Supplies	$ 265,871	$ 16,748	$151,934	$ 434,708
Metals Distribution	$ 660,069	$ 92,000	$ 69,000	$1,050,282
Plumbing, Heating & Air Conditioning	$ 837,715	$ 11,569	$273,332	$1,539,788
Construction Equipment	$ 32,794	$ 55,000	$ 36,500	$ 24,331
Electrical Wholesale	$ 334,034	—	$600,000	$ 245,378
Sporting Goods	$ 27,916	—	$ 20,000	$ 31,308
Automotive	$1,077,501	$118,950	$1,449,000	$1,108,293
Oil Field Supplies	$ 552,727	$ 18,000	—	$ 757,750
Aviation Supplies	$ 20,605	—	—	$ 26,492
Other	$1,478,342	$435,125	$605,885	$2,791,442

Size definitions: Small: Less than $2,500,000 in annual sales. Medium: $2,500,000 to $7,500,000 in annual sales. Large: More than $7,500,000 in annual sales.

Source: National Industrial Distributors Association; Southern Industrial Distributors Association.

Advertorial

A Message from Herman Dykema, Exec. Vice President, Startrite Incorporated

Startrite markets 100% through distributors. Distribution is on a limited and selective basis, primarily NIDA/SIDA and a number of AMTDA members.

Startrite offers its distributors the most experienced and knowledgeable field sales organizaton in the metal sawing industry.

Startrite from its all new facility in Kalamazoo, Michigan offers the finest and broadest range of metal sawing machines.

Startrite catalog H-83 describes 16 pages of Horizontal band cut-off machines consisting of 10 models ranging in capacity from 7" to 12.8".

Startrite catalog V-83 illustrates 17 models of Vertical bandsaw machines with 14" to 36" throats offering a vast assortment of features and options seldom found in other machines.

Startrite catalog C-82 contains 13 models of slow speed Circular Cold Saws for ferrous cutting with 10" to 14" diameter blades.

Startrite catalog HS-83 introduces a complete new line of large High Speed Horizontal band cut-off machines consisting of 12 models having 10" to 26" capacities both automatic and semi-automatic.

Startrite now introduces a new low-priced automatic (illustrated on the adjoining page) a completely self contained unit with a 12" x 14" capacity described in catalog supplement H-83.

Startrite in July will introduce 3 new models of High Speed Circular Cold Saws for non-ferrous consisting of a manual, semi-automatic, and completely automatic machine. CN supplement to catalog C-82 will carry all the information.

Startrite will also introduce a new Automatic Slow Speed Circular Cold Saw for ferrous cutting in a CF supplement to catalog C-82.

and combats price increases," Mr. Bradley explains.

And the distributor gives support and guidance in all phases of business. That's the know-how.

Good distributors provide an array of services. They conduct surveys to reduce inventory surpluses. They offer various computer services, renegotiation reports, composite corporate purchase analysis and automated billing systems. They can solve in-plant problems through their technical awareness or by relating success stories of product applications in similar industries. They demonstrate products and give the customer an objective opinion on product selection, Mr. Bradley says.

There's something for the manufacturer, too. They offer him visibility, says Mr. Bradley, certainly a more comprehensive sales force and proximity to the user. In addition, he says, they can also provide in-depth knowledge of the customer, ranging from his financial status to a first-hand community relationship with his employees.

The best thing a manufacturer can do for distributors is to give him quality and technical service. "Quality to a dis-

Advertorial

H-K Distributors See Blue in Metric Fastener Market

Holo-Krome, a leading American fastener manufacturer and its 350 distributors, are out to increase their share of the growing domestic metric market.

To do this, H-K distributors will begin stocking a full line of metric fasteners manufactured with a Holo-Blue™ finish, and packaged in smaller unit quantities.

Holo-Krome's strategy is twofold. First, metric threads are similar in appearance to those of the inch. Color identification will help eliminate cases of inch fasteners being put into metric holes or being mixed in stock rooms. Secondly, departure from the standard higher quantity boxes to smaller box quantities more closely allied to MRO requirements ultimately helps our distributors gain a larger share of the user market and be of better service to their customers.

The market is growing and so is the need. Demand for metrics, which began domestically some 15 years ago, now touches virtually all manufacturing industries. Moreover, with the influx of foreign machinery, more and more maintenance/repair personnel are faced with confusion in carrying out their normal repair activities.

Our Holo-Blue finish offers the user additional product advantages. First, it provides greatly improved corrosion resistance and extended shelf life. Secondly, our product line is a high strength metric fastener readily available—12.9. One inventory can now be used throughout a customer's plant to service virtually all metric fastener requirements.

Ray Van Horn
General Sales Manager
The Holo-Krome Company

To date we have already initiated a concentrated user ad campaign in targeted maintenance and purchasing publications. We are also providing our 350 distributors with a comprehensive promotional package that includes direct mailers, sample kits and qualified advertising leads.

In anticipating demand, our objective is to have distributor stocks in place within 90 days following the TIS Convention. We realize that metric requirements consist mainly of low-volume, maintenance and repairs. Packaging fewer fasteners to a box, will reduce the need for distributors to break boxes. This will keep distributor investment at a minimum.

Distributors have stressed the need for such consideration. It is difficult for a distributor to remain profitable pulling less than $5.00 worth of merchandise off the shelf. Holo-Krome has therefore determined box quantities in terms of a single box costing from $5 to $10. The result? Fewer broken boxes and lower distributor investment.

While color coding isn't exactly a new strategy, it may be just what the market requires to service the imported metric machines and new metric designs.

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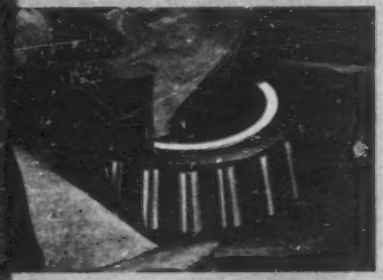

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tributor means the right thing at the right time. The marriage, uneasy as it may be, is going to stay with us for a long time. The old European system was to sell direct. But those countries are relatively small places. The size of the United States means we need industrial distributors," says Don Manning, Parker Hannifin's vice chairman.

And, perhaps, because of the recession, manufacturers are looking for distributors more than ever. They've cut their own field sales forces to the bone and distributors are finding inquiries higher than ever.

"I get a letter every day," says Robert Bokram, president, B-H Tool & Supply Co., Detroit. "They can't afford to get their product out to the country themselves.

"The adversary relationship between manufacturers and distributors is changing. World competitive forces are doing this. It's a buyers' market today.

"Tough times and technology are changing distribution, says B-H Tool & Supply's president.

"The hottest thing now," Mr. Bokram says, "is systems contracts and onsite ordering using CRTs and computers.

"As for CRTs, computers and high tech in general, paperless purchasing is the trend. Eventually, even the packing slip will go," he predicts.

Fifty pct of NIDA members, for example, are now computerized to some degree.

Another trend, he adds, is to handle two lines of any given item—the "quality" line and the "price" line. We are becoming a discount society even in industry, he says.

Still, the real power of the independent distributor, the real value-added is in the entrepreneur's long-term profit motive. Again, he sells.

"Every industrial distributor has a sales force, whatever the size of the sales force, that is an expansion of the manufacturer's sales force," adds Terry Poltorek, president, House of Plastics, Inc., Cleveland.

The industrial distributor will do whatever is necessary to sell the products in inventory. "Industrial distributors are always interested in finding new products which can be manufactured from the material they are selling or distributing," he adds, "so the additional sales people is one way that manufacturers expand market share."

Another important factor is literature. Industrial distributors carry a tremendous amount of literature, both marketing literature as well as technical data, on all the materials which they sell, says Mr. Poltorek.

Robert Olsen, chairman and president, Screw Machine Supply Co., Chicago, says one advantage of using a distributor is the reduced inventory of the manufacturer and end-user. Unfortunately, Mr. Olsen says, there's been a trend in recent years to concentrate less on the quality, in some cases, of the manufacturer's own people. "The people servicing us, in some cases, has been disappointing and their rapid turnover has also been a problem," he says.

Historically, manufacturers have used only well-trained people in the field and they've been in place for years. They were always very people oriented. Now, distributors are seeing disappointing manufacturers reps, he adds. "Our older people are training the manufacturers' people now," Mr. Olsen says.

"They're cutting back on qualified people because of the economy. Or, he continues, it may be a change in the nature of top management in manufacturing, from plant or sales oriented people to financial people.

"I would like manufacturers to make better use of us," he says. "We're so much more capable now in electronics and systems. We only need access."

"As the United States moves from an industrial to a service based economy, it's companies like ours that must demonstrate effective use of the hi-tech resources available today," adds J. Michael Fuchs, president, Fuchs Machinery & Supply, Inc., Omaha, Neb.

"We also find ourselves marketing products that are very technical and complex in nature, and we now have to develop the product specialists to convey these new ideas to the metalworking plants in our territory.

"It's our job as distributors to convince our manufacturers to utilize the latest in machine tools, robotics and hi-tech tooling so that we as a country can continue to compete with other countries and their lower labor rates," says Mr. Fuchs.

"We are the marketing experts," says Mr. Fuchs. "The Japanese found that out early."

The distribution business has indeed changed over the years. It has become quite a sophisticated profession.

But, even with CRTs and computers and systems, much of distribution will remain personal, notes a dean of distribution, consultant Charles P. Klein, president of Cannon Enterprises, Wyoming, Ohio.

"You have to know the people. They gotta like you and know you have integrity," insists Mr. Klein. □

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GROUP TECHNOLOGY: REVITALIZED BY COMPUTER POWER

Thanks to new computer-aided systems, group technology is making a comeback.

BY ROBERT E. HARVEY

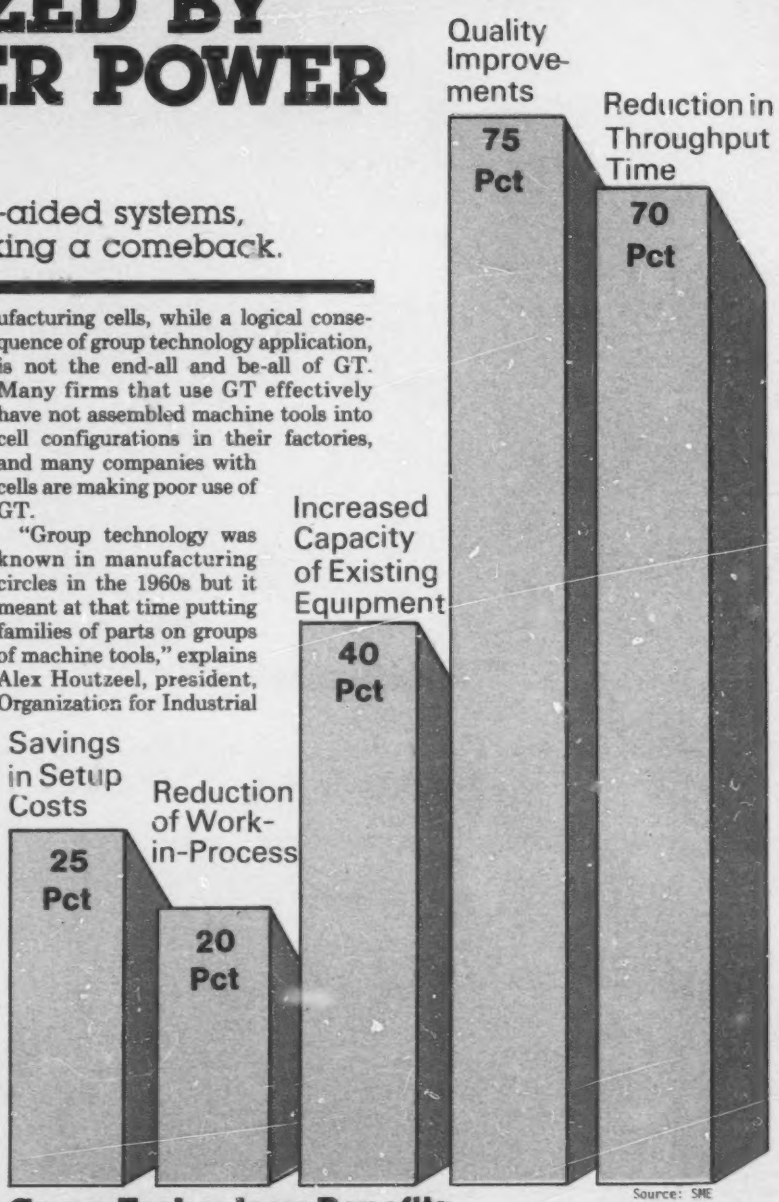
Group technology (GT) is an old concept—some say several thousand years old. Even in its modern form GT has been practiced as far back as World War II.

For all its longevity, group technology has not received the acclaim that its pioneers envisioned for it. Today, for example, it is being pushed from the spotlight by new concepts of factory automation and management. Attendance at seminars about robots, computers, CAD/CAM (computer-aided design/computer-aided manufacturing), CIM (computer-integrated manufacturing), CAPP (computer-aided process planning) and the like is, unlike GT conference participation, on the upswing.

But the fact is that all these advanced systems and technologies can benefit from the methodologies of GT. The invasion of the computer into nearly every area of factory management and operation has greatly increased the potential of GT to become a powerful organizational tool. As the need mounts to both rationalize the vast amount of manufacturing data spewing from computers and simplify the increasingly complex activities on the shop floor, GT will grow in importance. The Society of Manufacturing Engineers (which yearly sponsors a comprehensive seminar on group technology) forecasts that, by 1987 to 1990, some 50 pct of the major equipment manufacturers will have consciously applied GT.

Some misconceptions about GT must be aired out before GT wins an esteemed place in the hearts of U.S. manufacturers. First to be clarified is what GT is and what it is not. GT is not primarily a way of rearranging furniture. The formation of machinery into manufacturing cells, while a logical consequence of group technology application, is not the end-all and be-all of GT. Many firms that use GT effectively have not assembled machine tools into cell configurations in their factories, and many companies with cells are making poor use of GT.

"Group technology was known in manufacturing circles in the 1960s but it meant at that time putting families of parts on groups of machine tools," explains Alex Houtzeel, president, Organization for Industrial Research, Inc., Waltham, Mass. "The idea of ripping machine tools out of the shop floor and arranging them in groups scared a lot of people—and still does." The task of rearranging machinery was costly and risky; especially if a firm did not know if it would be making the same parts in the future.



Group Technology Benefits

Other people saw GT simply as a method of searching through a file cabinet for an engineering design.

However, GT is not a file or a machine tool arrangement system but a particular philosophical approach for solving manufacturing problems.

"Group technology can be defined as the bringing together of and organizing (grouping) of common concepts, princi-

ples, problems and tasks (technology) to improve productivity," according to a report given by Timothy J. Greene, professor at Virginia Polytechnic Institute, and Randall P. Sadowski, professor, Purdue University at a Society of Manufacturing Engineers' 1982 GT seminar in Chicago.

GT is finding the similarities within the product and process diversities of a company and exploiting these discoveries to improve operations.

What are the major benefits of knowing the similarities? According to Frederick B. Ingram, systems and procedures analyst with the Production Control Dept., Giddings & Lewis Electronics Co., Fond du Lac, Wis., the ability to class components based on common production or design attributes puts economies of scale within reach of batch processors. For example, a firm might discover that a group of parts, though shaped differently, can be machined on the same machine tools, using the same tooling and fixturing. Now larger batches can be run on the equipment.

"Also, the introduction of a brand new part into batch manufacturing is expensive," reports Mr. Ingram. "But if that new part somewhat resembles a previously designed part, introduction costs can be cut considerably."

Finding similarities between past design and manufacturing experience and future parts is another function of GT. If an experienced employee retires, some 25 years of knowledge goes along with him. Group technology can access some of that information through a classification and coding system. Classification and coding is a system of arrangement, much like a zip code or the library classification system.

"Classification and coding is the glue of group technology. It is the central focal point," says Glen C. Dunlap, director, systems design, Garrett Turbine Engine Co., Phoenix, Ariz. "Without it you have nothing."

The language used in classification and coding must be broad enough to cover all parts and all possible future parts (for the next 20 or so years). It must also be wide enough to describe all information desired on each particular part. Most important, the code must be able to group parts with similar traits.

Classification of parts is done according to their attributes. Attributes can include geometric shapes, manufacturing features and mechanical properties. Attributes can describe functional traits as well; for example, how a part relates to its end product.

"The basic assumption underlying the classification of parts by their shape or function is that similar parts should have similar costs, methods of manufacture, lead times, tooling requirements, processing flows and so on," outlines Mr. Ingram.

Groups of similar parts are called part families. All parts in a family have similar attributes. When parts have been classified and arranged into families, the information can be used most effectively if it is loaded into a computer's data base.

"Classification and coding is an intelligent way to go into a data base and search for information," explains Alex Houtzeel of the Organization for Industrial Research, Inc. "What group technology in my vision really looks like is a methodology to take by code number a whole family of parts out of the data base, look at the parts critically, and sift through the data with a whole set of sophisticated computer programs in order to discover which parts should really be designed in the same way or manufactured in the same way. Once this is done, you are ready for computer-aided process planning and all that sort of thing."

GT benefits a number of people. It benefits the design engineer by giving him easy access to previously designed parts that are similar to the part he is designing now. By studying part family histories, he no longer has to redesign the wheel. He can locate and eliminate duplicate designs. And he can reduce the size of the part family by standardizing: by designing one part that can be substituted for five or ten very similar parts.

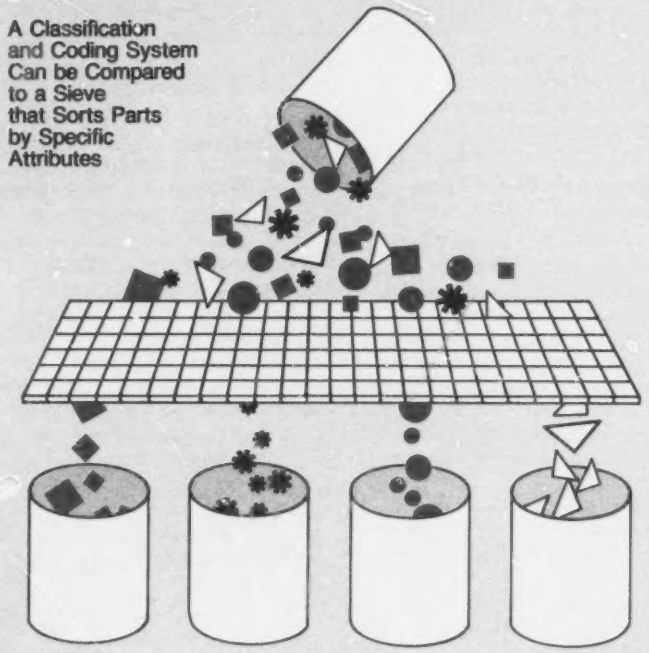
GT assists the process planner and the manufacturing engineer. With standardized parts, they now can set up standardized routings through the shop for those parts. By simplifying routings and better regulating the flow of parts, engineers can reduce tooling and fixturing costs, reduce set-up time, reduce throughput time, and generate easily retrievable process cost estimates.

Purchasing agents also are beginning to recognize the benefits of GT, for they are able to use leverage when shopping for large numbers of similar parts rather than small numbers of individual parts.

"At our facility, where engineering might use one family of parts and manufacturing might use a range of 20 part families, purchasing might use ranges of 100 families if what they want to do is get all pumps, for example, together at one crack. Now volume buying can be done for those 100 families," says Mr.

(Cont. on p. 69)

Classification and Coding System



Source: Organization for Industrial Research Inc.

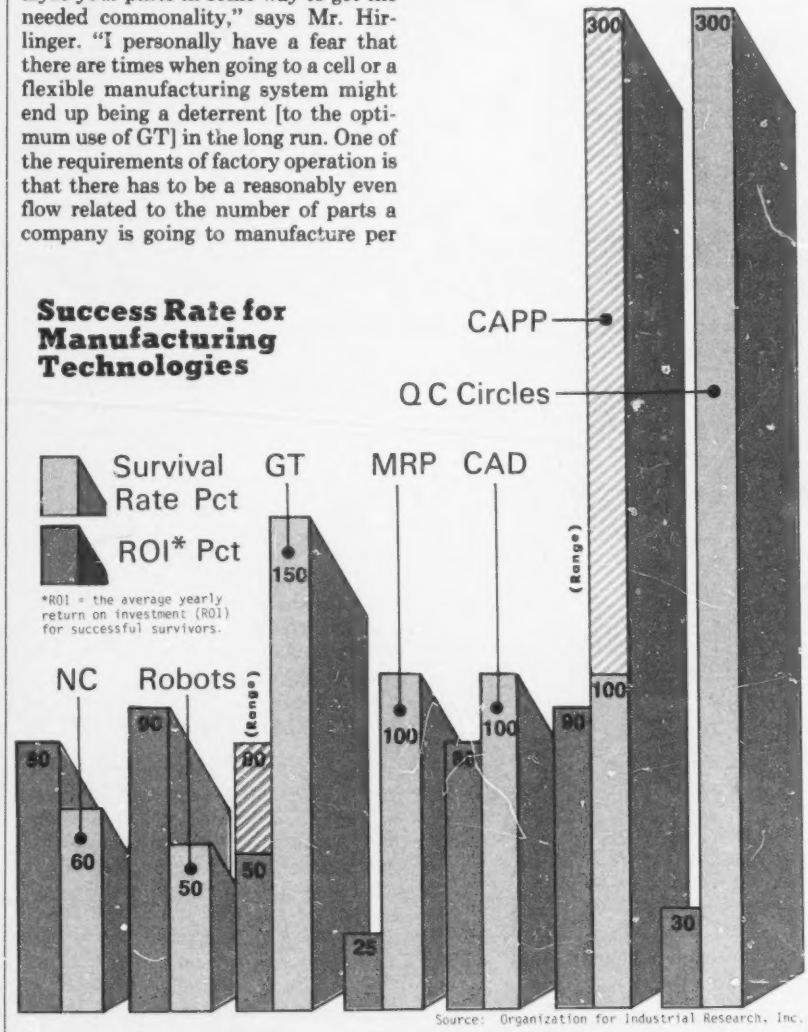
purposes not originally intended. Real problems can occur if the parts being made on a cell no longer fit into the particular restraints of that cell. Running parts from cell to cell defeats its purpose.

"If you are going to set up an efficient cell, the first thing you have to do is analyze your parts in some way to get the needed commonality," says Mr. Hirlinger. "I personally have a fear that there are times when going to a cell or a flexible manufacturing system might end up being a deterrent [to the optimum use of GT] in the long run. One of the requirements of factory operation is that there has to be a reasonably even flow related to the number of parts a company is going to manufacture per month. That flow is not always compatible with cellular operations."

Manufacturing cells should not be set up on impulse. 'But I need a place to put my new robot,' is not an adequate reason. Companies even should look closely at whether a comprehensive computerized GT should be implemented. The philosophy of GT is valuable, but its installation is often time-consuming and expensive.

The system often takes several years to implement, especially if a company sets up its own classification and coding system. Firms that develop their own GT systems cite the need to customize classification and coding to their particular product mix and requirements as the reason they did not purchase a standard software coding package or bring in a firm to install GT in turnkey fashion.

Success Rate for Manufacturing Technologies



Source: Organization for Industrial Research, Inc.

Other firms like Baker Packers, however, relied on outside assistance and are very satisfied with the results. "Why reinvent the wheel," comments a company spokesman.

Besides the time required to put in a GT system, the costs of rearranging machinery to accommodate families of parts and the expense of modifying old design files often are high. Additional staff also might be needed.

Once installed, other problems can arise. As mentioned previously, machines set up to turn out only one family of parts may be underutilized at times. Also, cells might have to be rearranged eventually. In addition, a cell is less flexible than a functional layout when it comes to accommodating unexpected change. And if product obsolescence is slow, cost savings for the design department may be small.

In the abstract, the GT philosophy has value for everyone. How GT is applied in the concrete is another matter. Comprehensive on-going GT systems are not for everyone. Some 20 to 50 pct of the firms that have tried GT have encountered serious problems. Firms that make only several hundred parts, for example, probably have little need for computerized coding.

One firm that produced some 20,000 parts turned to GT. Using classification and coding, and the optimization and standardization of design, that number was reduced to below 700. GT certainly was a benefit to the firm, but now with only about 700 parts to worry about, the decision was made to discontinue using GT until a proliferation of parts makes operations unmanageable again. The point is that GT is a problem-solving tool and before a firm decides to use GT it must painstakingly uncover what problems must be solved and how GT can best be used.

The shop is the ultimate proving ground for new manufacturing techniques and philosophies. It is also a place of potential friction between conflicting systems. Just as the problem of integrating material and geometric parts languages has yet to be solved; so too, the question of how to best interrelate material requirements planning and group technology on the shop floor is still waiting for an answer.

Material requirements planning started out as simply an order launching system, relates Mr. Houtzeel. "But in recent years it has evolved into a full-fledged manufacturing information system involving production requirements and closed-loop feedback from the shop floor describing what is really happening in manufacturing operations. It has essentially evolved into a manufacturing resource planning system (sometimes called MRP II)."

"I am not sure that there are very many people who have addressed that problem [of linking GT and MRP] adequately," explains Dr. Dunlap. "At Garrett we start with a customer sales order. We then develop an assembly schedule. That schedule is then fed into our MRP system. Out of the MRP system we then generate input to what we call an order release system."

That system either places a purchase order with an outside company for a

BEST AVAILABLE COPY

part or releases a production work order in the shop. From the order release cycle it goes into a shop status system; there shop floor scheduling occurs.

"Now we maintain a distinction between MRP and the shop scheduling system," continues Dr. Dunlap. "We do not try to schedule our shop with MRP nor do we try to take GT and allow it to have significant influence elsewhere."

According to Mr. Ingram, once MRP is in place it is difficult to modify it to accommodate some of the benefits of GT. "Say you have five or six different parts. They are all reasonably similar, so you say, 'OK, we are going to run shop orders for all these through the cell at the same time to take advantage of set ups and the rest.' It is fine in theory, but may not work in practice."

Scheduling can become very difficult because the MRP system is trying to optimize inventory while GT is attempting to optimize operating costs.

"It should be pointed out that GT work centers are generally set up to handle large numbers of parts, matched to the user's annual requirements," explains Mr. Houtzeel. "MRP proponents have sometimes misunderstood the GT approach, assuming it to lead to highly efficient work centers which produced a few (types) of parts each, but in quantities which were ahead of needs, so that large finished parts inventories were built up.

"This is not the case . . . A properly structured GT work center does not lead to excessive finished parts inventories."

Both MRP and GT are useful tools, the remaining task is a successful integration of the two. □

Metalworking's Manufacturing System: 40

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EFFECTIVE MAY 9, 1983

MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective May 9, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,683	1,717	27,319	30,608
Capability Utilization Rate	58.2	59.4	52.0	57.2

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.297
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 66.83	$ 66.83	$ 70.83	$ 71.50
No. 2 bundles	$ 46.50	$ 46.83	$ 48.50	$ 47.50
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 68.50	$ 63.50	$ 75.50	$ 75.50
No. 1 steel, Philadelphia	64.50	64.50	64.50	71.50
No. 1 steel, Chicago	67.50	67.50	72.50	67.50
No. 1 bundles, Detroit	69.50	69.50	75.50	67.50
Low Phos., Youngstown	72.50	69.50	69.50	83.50
No. 1 mach'y cast., Pgh	74.50	74.50	76.50	86.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	113.50
No. 1 mach'y cast., Chi	108.50	108.50	110.50	119.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective May 9, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	83.00-84.00	81.50-83.00	5/3/83
Lead	20.00-23.00	21.00-23.00	5/4/83
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	4/27/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $215.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.55-$1.60
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $434.00
Indium, dollars per troy oz. $3.10
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$315-$335
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $12.59
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

May 2—Holiday
May 3—618.13
May 4—618.70
May 5—619.56
May 6—620.05

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ pc: lb)

	Solids	Turning
Copper	78½	69¼
Yellow brass	66⅜	61⅛
Red brass	72	65⅝
Comm. bronze	73¾	67
Mang. bronze	64¾	63
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	72
No. 2 copper wire	64
Light copper	55

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	68
No. 2 copper wire	60
Light copper	51
No. 1 composition	55
No. 1 comp. turnings	50
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	28
Radiators	44

Aluminum

New mixed clips	37	—38
Old sheet	35	—36
Old cast	35	—36
Clean dry borings	36	—37

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	29	—30
Mixed L.C. clips	26	—27
Old sheets and cast	22	—23
Borings and turnings	15	—16
Duraluminum clippings	23	—24

Copper and Brass

No. 1 copper wire	59	—60
No. 2 copper wire	53	—54
Light copper	46	—47
Radiators	37	—38
No. 1 composition	47	—48
No. 1 composition turn'gs	44	—45
Cocks and faucets	33	—34
Clean heavy yellow brass	31	—32
Brass Pipe	32	—33
New soft brass clippings	47	—48

Lead

Heavy soft lead	10	—11
Whole batteries	4	— 5
Type metal	15	—16
Electrotype	17	—18

Nickel

Nickel solids	100	—110
Nickel rod ends	100	—110
Nickel sheets, clips	100	—110
Nickel turnings	50	— 60

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

MATERIALS NEWSFRONT

(Effective May 9, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 68.00 to	$ 69.00
No. 2 hvy. melting	60.00 to	61.00
No. 1 dealer bundles	84.00 to	85.00
No. 1 factory bundles (auto)	79.00 to	80.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	78.00 to	79.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	28.00 to	29.00
Cast iron borings	27.00 to	28.00
Low phos. punchings plate	88.00 to	89.00
Heavy turnings	60.00 to	61.00
No. 1 RR hvy. melting	76.00 to	77.00
Rails 2 ft. and under	95.00 to	96.00
Scrap rails, random lgth.	80.00 to	81.00
RR specialties	87.00 to	88.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	590.00 to	600.00
18-8 turnings	490.00 to	500.00

Chicago

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	60.00 to	61.00
No. 1 dealer bundles	81.00 to	82.00
No. 1 factory bundles (auto)	79.00 to	80.00
No. 2 dealer bundles	44.00 to	45.00
No. 1 busheling	74.00 to	75.00
Shredder scrap	73.00 to	74.00
Machine shop turn.	17.00 to	18.00
Mixed bor. and turn.	18.00 to	19.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	38.00 to	39.00
Low phos. forge crop	87.00 to	88.00
Low phos. punchings plate ¼ in. and heavier	94.00 to	95.00
Low phos. 2 ft. and under	89.00 to	90.00
No. 1 RR hvy. melting	79.00 to	80.00
Scrap rails, random lgth.	67.00 to	68.00
Reroller rails	93.00 to	94.00
Rails, 2 ft. and under	90.00 to	91.00
RR couplers and knuckles	77.00 to	78.00
RR car axles	109.00 to	110.00
No. 1 machinery cast	108.00 to	109.00
Cupola cast	93.00 to	94.00
Stove plate	92.00 to	93.00
Steel car wheels	79.00 to	80.00
Stainless		
18-8 bundles and solids	560.00 to	580.00
18-8 turnings	450.00 to	480.00
430 bundles and solids	135.00 to	140.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	$ 63.00 to	$ 66.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	74.00 to	77.00
No. 2 dealer bundles	42.00 to	45.00
No. 1 busheling	74.00 to	77.00
Shredder scrap	73.00 to	76.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	42.00 to	45.00
Low phos. 5 ft. and under	73.00 to	76.00
Low phos. 2 ft. punchings	89.00 to	92.00
Electric furnace bundles	93.00 to	96.00
RR specialties	80.00 to	83.00
Rails, 2 ft. and under	92.00 to	95.00
Cupola cast	60.00 to	63.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	45.00 to	46.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	66.00 to	67.00
Drop forge flashings	42.00 to	43.00
Machine shop turn.	25.00 to	26.00
Mixed borings and turn.	13.00 to	14.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	13.00 to	14.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	470.00 to	480.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	$ 66.00 to	$ 67.00
No. 2 hvy. melting	58.00 to	59.00
No. 1 dealer bundles	77.00 to	78.00
No. 2 dealer bundles	39.00 to	40.00
Machine shop turn.	2.00 to	3.00
Shoveling turnings	7.00 to	8.00
Low phos. plate	72.00 to	73.00
Electric furnace bundles	70.00 to	71.00
Galvanized bundles	68.00 to	69.00

Cleveland

No. 1 hvy. melting	$ 59.00 to	$ 60.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	73.00 to	74.00
No. 1 factory bundles	76.00 to	77.00
No. 2 bundles	24.00 to	25.00
No. 1 busheling	73.00 to	74.00
Machine shop turn.	2.00 to	3.00
Mixed bor. and turn.	2.00 to	3.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	5.00 to	6.00
Cut structural & plates, 2 ft. and under	89.00 to	90.00
Low phos. punchings plate	89.00 to	90.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	59.00 to	60.00
No. 1 RR hvy melting	63.00 to	64.00
Rails, 2 ft. and under	93.00 to	94.00
Rails, 18 in. and under	94.00 to	95.00
Steel axle turnings	69.00 to	70.00
Railroad cast	82.00 to	83.00
No. 1 machinery cast	89.00 to	90.00
Cupola cast	62.00 to	63.00
Stove plate	47.00 to	48.00
Stainless		
18-8 bundles	325.00 to	335.00
18-8 turnings	275.00 to	285.00
430 bundles	80.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 busheling	36.00 to	39.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.	9.00 to	10.00
Mixed bor. and turn.	16.00 to	17.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	15.00 to	16.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	50.00 to	51.00
Scrap rails, random lgth.	30.00 to	31.00
No. 1 machinery cast	71.00 to	72.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	47.00 to	48.00
Foundry steel, 2 ft.	47.00 to	48.00
No. 1 dealer bundles	58.00 to	59.00
No. 2 bundles	44.00 to	45.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	58.00 to	59.00
Rails, random length	61.00 to	62.00
Rails, 18 in. and under	76.00 to	77.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	82.00 to	83.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	96.00 to	97.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 64.00 to	$ 65.00
No. 2 heavy melting	59.00 to	60.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	63.00 to	64.00
Shredder scrap	77.00 to	78.00
Machine shop. turn.	24.00 to	25.00
Shoveling turnings	35.00 to	36.00
Cast iron borings	35.00 to	36.00
Electric furnace bundles	62.00 to	63.00
Elec. furnace, 3 ft. & under	59.00 to	60.00
Structural and plate, 2 ft.	76.00 to	77.00
Structural and plate, 4 ft.	73.00 to	74.00
No. 1 RR hvy. melting	63.00 to	64.00
Scrap rails, random lgth.	68.00 to	69.00
Rails, 18 in. and under	86.00 to	87.00
Angles and splice bars	76.00 to	77.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	59.00 to	60.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 48.00 to	$ 49.00
No. 2 hvy. melting	48.00 to	49.00
No. 1 dealer bundles	53.00 to	54.00
No. 2 bundles	27.00 to	28.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	8.00 to	9.00
Cast iron borings	11.00 to	12.00
Low phos. 18 in. and under	72.00 to	73.00
Rails, random length	54.00 to	55.00
Rails, 2 ft. and under	74.00 to	75.00
No. 1 cupola cast	58.00 to	59.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	67.00 to	68.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	480.00 to	500.00
18-8 turnings	380.00 to	400.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	40.00 to	42.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	40.00 to	42.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 42.00 to	$ 44.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	13.00 to	15.00
Machine shop turn.	6.00 to	8.00
Cast iron borings	6.00 to	8.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	30.00 to	32.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 dealer bundles	10.00 to	12.00
Machine shop turn.	6.00 to	8.00
Shoveling turnings	10.00 to	12.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under (foundry)	86.00 to	88.00
No. 1 cupola cast	88.00 to	90.00

Seattle

No. 1 hvy. melting	$ 80.00 to	$ 82.00
No. 2 hvy. melting	49.00 to	51.00
No. 2 bundles	39.00 to	41.00
No. 1 cupola cast	94.00 to	96.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 55.00
No. 2 heavy melting cut 2 ft. and under	52.00
No. 1 dealer bundles	60.00
No. 2 bundles	30.00
Mixed steel scrap	34.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	25.00
Short steel turn.	28.00
Mixed bor. and turn.	15.00
Cast scrap	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	34.00 to	36.00
Machine shop turn.	19.00 to	20.00
Crushed turnings	35.00 to	37.00
Shredder scrap	67.00 to	68.00
Cut structural plate 2 ft. and under	84.00 to	86.00
Unstripped motor blocks	58.00 to	60.00
Cupola cast	71.00 to	73.00

METALWORKING ORDER TRENDS

Future looks good as orders go up and stocks go down

The latest complete data on monthly orders flowing to producers of durable goods shows a continuing upward movement. In March, these orders went up by 3.5 pct over February to an $80.8 billion level.

The March rise reversed the 3.5 pct decline in orders during February. More importantly.

March orders were up 16 pct from the recession low point of $69.6 billion in October of last year.

The March data on new orders, shipments and inventories carries the promise of further near-future gains. Orders received by durable goods manufacturers (85 pct in metalworking) in March ran ahead of shipments by $1.2 billion.

On top of that, inventories fell by a sharp $2.4 billion.

Commerce Secretary Malcolm Baldrige, in noting this good-tidings of data, said it means that "future demand gains will have to be matched by further increases in production."

In other words, companies soon will not be able to fill their customer orders out of stock; they will have to place more orders themselves. That's the chain buildup of orders that leads to solid recovery.

Still, orders have a way to go before they again equal pre-recession levels. Orders in March were down about 8 pct from the peak of $87.6 billion reached in October 1981.

After adjustment for inflation, this means March orders were really down by about 17 pct.

Two notable figures on the table here include orders received by nondefense capital goods producers and orders for nonelectrical machinery. These gains are related in that most of the increase in each case was due to surging strength in orders for office and computing equipment.

A backward step in orders was scored by the steel industry in March. In a roller-coaster move, these orders were down 15 pct in dollar volume—after having gone up by 21 pct in the month before.

Producers of defense-related capital goods also received more orders in March than in February.

These rose 25 pct to put dollar volume of orders at $7.7 billion for the month.

Further gains in these orders in the months ahead are anticipated by most industry executives.

Source: U.S. Dept. of Commerce Billions of dollars, seasonally adjusted monthly total, unless otherwise noted		Last Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
Capital Expenditures (Annual Rates)				
U.S. Industry, Total	2nd Qtr.	$302.2*	$302.3	$323.2
Manufacturing, Total	2nd Qtr.	111.3*	112.8	123.8
Manufacturing, Durable Goods	2nd Qtr.	50.9*	52.8	59.0
Mining Industry	2nd Qtr.	14.6*	14.6	16.6
Key Indicators, Durable Goods Manufacturing				
New Orders	March	80.8	78.1	77.9
Shipments	March	79.6	77.6	78.1
Inventories	March	171.1	173.5	186.1
Unfilled Orders	March	290.4	289.2	305.9
New Orders, Metalworking				
Capital Goods Producers, Nondefense Industries	March	20.8	18.8	22.2
Capital Goods Producers, Defense Industries	March	7.7	6.1	7.1
Primary Metals, Total	March	8.4	9.7	7.6
Steel (SIC 331)	March	3.5	4.1	3.4
Iron & Steel Castings (SIC 332)	March	0.7	0.9	0.8
Nonferrous Metals	March	4.2	4.8	3.4
Nonelectrical Mach.-Equip. Industries, Total	March	14.9	12.6	14.4
Engines & Turbines	March	0.9	1.0	1.0
Farm Machinery & Equipment (Shipments)	March	0.9	0.8	1.0
Construction, Mining & Materials Hdlg. Equip.	March	1.9	1.8	2.4
General Industrial Machinery	March	1.0	1.2	1.2
Fluid Power Equipment** (Index-1972=100)	March	212	197	257
Metalworking Machinery	March	0.6	0.6	0.5
Machine Tools, Total (Millions $, unadjusted)***	March	125.6	97.5	137.8
Machine Tools, Metal-Cutting***	March	77.4	77.4	105.8
Machine Tools, Metal-Forming***	March	35.9	20.1	32.0
Electrical Mach. & Equip. Industries, Total	March	12.5	12.1	12.8
Elec. Transmission Equip. & Industrial Apparatus	March	1.6	1.7	1.7
Household Appliances	March	1.2	1.1	1.0
Communication Equipment	March	4.3	4.1	5.0
Transportation Equip. Industrial, Total	March	19.3	18.0	17.1
Motor Vehicles & Parts (Shipments)	March	10.9	11.3	8.8
Aircraft, Missiles & Parts	March	7.4	5.6	7.2
Shipbuilding & Military Tanks	March	0.2	0.3	0.5
Fabricated Metal Products, Total	March	9.4	9.2	9.8
Instruments, Total	March	3.7	3.9	4.0

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA.

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IRON AGE 1982 STEEL INDUSTRY FINANCIAL ANALYSIS

Data Cover Operations of Companies Representing Approximately 90 pct of the Steel Industry

Company[1]	Year	Raw Steel Production Thousands of Net Tons	Steel Shipments Thousands of Net Tons	Net Sales & Operating Revenues Thousands of Dollars	Employment Costs Thousands of Dollars	Employment Costs as Percent of Sales	Operating Profit[2] 000 of $	Operating Profit as Percent of Sales	Depreciation Depletion and Amortization 000 of $	Provision for Federal Income Taxes 000 of $	Net Income 000 of $	Net Income Percent of Sales	Invested Capital (to included funded debt payable after one year preferred and common stock surplus) 000 of $	Net Income Percent of Investment[4]	Working Capital 000 of $	Funded Debt (Payable after 1 year) 000 of $	Interest Expense on Funded Debt 000 of $	Capital Expenditures 000 of $	Stockholders' Equity 000 of $	Pct Return on Stockholders' Equity	Number of Common Shares Outstanding 000 of $	Common Stock 000 of $	Common Dividend Declared 000 of $	Earnings Per Common Share	Dividends Per Common Share	Price Range Common Share	P/E Ratio	
1. United States Steel Corp.[6,7]	1982	12,100	10,300	18,907,000	4,395,000	23.2	2,140,000	11.3	1,031,000	408,000	(361,000)	(1.9)	14,340,000	3.8	710,000	6,843,000	911,000	1,936,000	6,468,000	(5.6)	102,098	2,042,000	166,000	(3.99)	1.75	30⅛-16	(8)-(4)	1.
	1981	23,400	16,600	13,941,000	5,078,000	36.4	2,500,000	17.9	571,000	666,000	1,077,000	7.7	9,295,000	14.0	2,589,000	2,340,000	226,000	843,000	6,260,000	17.2	90,579	1,812,000	178,000	12.07	2.00	35¼-23⅜	3-2	
2. Bethlehem Steel Corp.[8]	1982	10,521	8,154	5,260,300	2,628,600	50.0	(1,025,800)	(19.5)	388,900	(27,000)	(1,469,600)	(27.9)	2,508,200	(55.5)	410,600	1,271,400	77,900	470,300	1,236,800	(53.2)	43,682	507,200	56,800	(33.64)	1.30	23.50/14.625	—	2.
	1981	16,721	11,572	7,298,000	3,115,700	42.7	730,600	10.0	377,300	57,000	210,900	2.9	3,735,600	7.3	856,400	972,400	60,400	455,300	2,763,200	8.0	43,682	507,200	69,900	4.83	1.60	32.00/19.75	6.63/4.09	
3. LTV Corp. (Jones & Laughlin[9,10,11,12]	1982	6,486	5,142	4,776,800	1,723,100	36.1	(63,000)	(1.3)	101,500	(106,900)	(154,900)	(3.4)	2,674,500	(1.9)	819,100	1,459,900	105,000	290,100	1,115,800	(12.9)	49,020	557,603	21,400	(3.20)	0.4375	17¾-8⅛	(3.4)	3.
	1981	10,858	7,595	7,053,700	2,022,800	28.7	749,900	10.6	126,400	126,500	386,300	5.5	2,695,700	19.2	977,100	1,243,300	112,000	301,800	1,285,400	40.8	48,189	789,095	—	7.97	—	26⅛-12⅝	2.1	
4. National Steel Corp.	1982	5,501	4,956	3,044,214	1,170,200	38.4	(523,355)	—	148,163	(269,709)	(462,773)	—	1,676,031	—	182,715	671,784	66,205	101,557	1,007,247	—	18,644	67,550	19,845	(24.77)	1.0625	24½-13⅜	—	4.
	1981	8,168	6,613	4,062,291	1,306,400	32.2	303,038	7.5	158,071	8,300	86,084	2.1	2,163,932	6.4	373,629	676,735	52,783	186,073	1,492,197	5.8	18,753	69,882	37,470	4.59	2.00	30⅜-22⅝	6.7-4.9	
5. Inland Steel Co.[13]	1982	5,171	4,086	2,843,989	1,105,654	39.4	(50,840)	—	125,296	(107,587)	(118,795)	(4.2)	1,957,469	—	265,110	758,747	64,559	94,175	1,198,722	—	21,342	283,829	23,975	(5.60)	1.125	18⅛-26¼	—	5.
	1981	8,054	5,781	3,820,056	1,239,137	33.0	293,122	7.8	161,194	11,530	57,255	1.5	2,087,164	4.4	410,730	777,993	63,143	134,535	1,309,171	4.4	20,957	255,329	42,039	2.69	2.00	22¼-36	9	
6. Armco Inc.[14]	1982	5,104	4,112	5,427,900	1,911,100	35.2	143,500	2.6	196,900	(278,300)	(345,100)	(6.4)	2,750,300	(9.7)	613,300	769,500	77,200	338,500	1,980,800	(15.5)	65,554	327,800	94,400	(5.41)	1.50	27⅜-14½	—	6.
	1981	8,188	5,767	6,906,000	1,967,900	28.5	702,300	10.2	174,300	130,700	294,500	4.3	3,147,400	10.8	1,062,000	680,200	45,400	393,600	2,467,200	13.7	63,303	316,500	99,500	4.97	1.72	41⅜-24½	5.63	
7. Republic Steel Corp.	1982	5,086	4,345	2,738,160	1,174,189	42.9	(325,110)	(11.9)	86,070	(224,000)	(239,219)	(8.7)	2,256,010	(8.1)	313,216	852,974	56,671	214,799	1,403,036	(14.4)	16,183	161,827	18,206	(14.78)	1.125	24.625-13.875	(1.3)	7.
	1981	9,433	6,535	4,382,073	1,511,168	34.5	369,343	8.4	129,627	25,800	190,087	4.3	2,261,292	9.5	486,748	600,244	23,827	299,221	1,661,048	12.6	16,183	161,827	36,411	11.75	2.25	32.125-22.375	2.3	
8. Wheeling-Pittsburgh Steel Corp.[15,16,17]	1982	1,818	1,368	775,403	355,221	45.8	(30,142)	(3.9)	38,219	(24,828)	(58,769)	(7.6)	939,623	(2.5)	230,026	495,915	35,402	160,211	443,708	(13.2)	4,005	40,051	—	(15.98)	—	12.25-30.25	—	8.
	1981	2,944	2,146	1,204,889	463,814	38.5	100,901	8.4	42,989	6,600	60,059	5.0	834,324	9.6	195,477	358,733	19,769	110,177	475,591	12.6	3,968	39,681	—	14.28	—	19.625-39.75	2.1	
9. Nucor Corp.	1982	1,216	1,127	486,018	108,541	22.3	74,374	15.3	26,287	15,600	22,192	4.6	280,511	10.7	66,440	48,230	7,785	14,789	232,281	10.0	6,996	20,359	3,626	3.18	.52	63.50-34.13	20.0-10.7	9.
	1981	1,512	1,292	544,821	116,059	21.3	78,172	14.3	21,600	10,100	34,729	6.4	296,130	15.3	58,350	83,754	10,472	101,519	212,376	17.8	6,964	19,021	3,326	5.02	.48	82.25-49.00	16.4-9.8	
10. Korf Industries, Inc.[18,19]	1982	1,175	1,101	318,312	74,009	23.3	—	—	—	—	—	—	—	—	—	—	12,100	—	—	—	—	—	—	—	—	—	—	10.
	1981	1,318	1,225	411,158	76,262	18.5	57,571	14.0	—	—	1,895	.5	277,326	—	36,334	—	26,014	—	—	—	—	—	—	—	—	—	—	
11. Sharon Steel Corp.	1982	1,054	822	692,886	221,886	32.0	4,017	.06	30,040	(58,963)	(105,636)	(15.2)	649,054	.09	69,195	539,322	111,590	23,136	109,732	(96.3)	82,053	822	7,385	(1.29)	.09	5⅜-1⅞	—	11.
	1981	1,465	1,124	911,973	251,264	22.6	140,118	15.4	29,050	(2,900)	20,777	2.3	758,280	16.1	190,171	535,527	101,135	54,847	222,753	9.3	82,053	822	29,539	.25	.36	6⅛-3¼	27.50-15.00	
12. Northwestern Steel & Wire Co.	1982	1,041	809	323,303	126,873	39.2	(22,131)	(6.8)	16,074	(24,046)	(14,170)	(4.4)	248,477	(5.7)	84,979	—	11	57,745	248,477	(5.7)	7,506	37,532	7,506	(1.89)	1.00	26-14⅛	(14)-(8)	12.
	1981	1,523	1,207	468,494	146,989	31.4	67,490	14.4	14,502	24,814	28,130	6.0	270,153	10.4	126,900	—	44	24,742	270,153	10.4	7,506	37,532	9,008	3.75	1.20	29¼-20¼	8-5	
13. Kaiser Steel Corp.	1982	873	943	734,935	353,993	48.2	24,016	3.3	60,363	(48,000)	2,665	0.4	489,062	6.7	327,711	223,943	30,043	45,846	265,119	1.0	7,267,256	149,887	—	.29	—	24⅞	56	13.
	1981	2,000	1,485	1,012,708	428,176	42.3	159,994	15.8	48,541	(14,000)	(438,719)	(43.3)	506,987	(81.7)	332,650	242,963	24,346	97,619	264,024	(166.2)	7,266,956	322,471	—	(61.70)	—	50¾	—	
14. CF&I Steel Corp.	1982	794	617	362,835	177,145	48.8	(18,809)	(5.2)	41,645	(31,836)	(23,495)	(6.5)	254,117	(9.2)	12,991	50,000	79	97,336	204,117	(10.8)	3,966	19,829	3,966	(5.92)	1.00	36-21	—	14.
	1981	1,597	1,150	723,766	280,286	38.7	115,960	16.0	52,872	24,183	39,231	5.4	231,577	19.2	33,600	—	5,282	47,182	231,577	17.9	3,966	19,829	13,880	9.89	3.50	47-33½	3-5	
15. Florida Steel Corp.[20,21]	1982	721	648	246,543	59,669	24.0	2,384	1.0	9,250	(8,200)	(8,321)	(3.3)	154,624	.9	45,345	58,661	9,655	6,603	92,015	(8.5)	5,963	8,339	3,631	(1.40)	.61	19¼-10½	—	15.
	1981	920	832	319,524	59,702	18.7	36,014	11.3	5,678	9,892	19,699	6.2	137,768	14.8	45,524	55,492	746	54,000	103,082	19.1	5,911	7,453	2,871	3.33	.4875	19⅜-7⅝	5.8-2.3	
16. Chaparral Steel Co.[22]	1982	607	520	148,474	31,437	21.17	19,286	12.99	10,935	(5,874)	12,208	8.22	263,053	14.52	25,534	189,343	25,995	149,355	73,710	16.56	4,500	4,500	—	2.71	—	—	—	16.
	1981	429	393	143,546	21,287	14.83	22,334	15.56	3,555	463	15,232	10.61	203,352	14.58	19,119	141,750	14,420	121,468	61,502	24.77	4,500	4,500	—	3.38	—	—	—	
17. Cyclops Corp.	1982	526	639	873,165	261,358	29.9	(1,379)	(.2)	17,856	(15,709)	(11,921)	(1.4)	242,682	(3.2)	122,976	64,339	8,395	19,442	178,343	(6.7)	3,753	3,753	3,788	(3.60)	1.10	13⅜-27⅛	—	17.
	1981	489	751	1,031,414	272,342	26.4	65,381	6.3	16,978	16,953	21,384	2.1	253,524	10.4	132,264	59,032	10,066	19,659	194,492	11.0	3,736	3,736	4,383	6.21	1.30	24¼-39	4.1	
18. Lukens Steel Co.[23]	1982	495	—	389,678	—	—	28,835	7.4	17,561	(306)	1,479	.4	232,044	5.0	53,376	91,894	10,101	15,131	140,150	1.0	5,193	3,180	3,760	.28	.72	13½-8¾	48.2-31.3	18.
	1981	722	—	405,718	—	—	34,843	8.6	12,946	8,703	10,634	2.6	173,476	7.6	36,018	30,242	2,560	9,845	143,234	7.8	5,233	3,180	3,297	2.03	.63	17¼-12½	8.5-6.2	
19. Laclede Steel Co.	1982	487	349	178,223	76,799	43.1	(3,355)	(1.9)	5,293	(3,176)	(8,106)	(4.5)	83,839	(6.5)	37,490	29,200	2,634	7,227	54,639	(14.8)	2,210	44,200	—	(3.67)	—	10-7	—	19.
	1981	631	482	252,722	95,856	37.9	14,666	5.8	5,039	3,374	3,935	1.6	86,595	7.2	43,261	23,850	2,318	6,038	62,745	6.3	2,210	44,200	—	1.78	—	17¼-9	10-5	
20. Keystone Consolidated Industries, Inc.	1982	427	418	351,919	148,269	42.1	2,646	.8	10,708	994	(13,420)	(3.8)	154,334	(5.9)	70,912	56,902	4,364	11,975	97,288	(13.8)	1,874	2,610	—	(7.16)	—	19⅛-9	—	20.
	1981	602	521	401,340	157,120	39.1	13,789	3.4	10,262	19	(557)	(.1)	151,549	2.3	72,868	40,797	4,065	9,049	110,608	(.5)	1,874	2,610	—	(.30)	—	20¼-8⅝	—	
21. Interlake Inc.[24,25,26]	1982	420	327	767,300	268,969	35.1	38,674	5.0	22,956	272	5,752	.7	470,550	2.5	175,891	122,338	10,994	27,864	323,251	1.6	5,708	87,010	15,998	.92	2.60	35½-22½	34.0	21.
	1981	691	526	1,016,605	308,763	30.4	114,660	11.3	25,976	30,953	46,577	4.6	498,358	10.6	199,803	126,618	11,354	37,393	358,748	13.5	6,179	100,292	14,735	7.59	2.40	45-27½	4.5	
22. Phoenix Steel Corp.[27]	1982	274	198	148,612	59,362	39.9	(3,711)	(2.5)	3,939	—	(17,491)	(11.8)	158,666	(2.8)	4,093	72,308	13,086	6,982	11,817	(148.0)	9,201	21,089	—	(2.07)	—	2.375-1.125	—	22.
	1981	404	280	207,469	68,825	33.2	22,353	10.8	5,909	—	2,012	1.0	151,462	10.8	15,753	90,084	14,382	12,816	4,339	46.3	9,185	21,088	—	.05	—	3.375-1.750	—	
23. Copperweld Corp.	1982	246	337	374,485	134,400	35.9	10,395	2.8	15,824	(6,533)	(10,128)	(2.7)	265,729	(1.4)	65,148	94,544	6,398	42,953	171,185	(5.9)	8,603	7,173	9,974	(1.18)	1.16	24¾-12¾	—	23.
	1981	612	622	618,454	186,227	30.1	87,324	14.1	13,762	31,239	37,221	6.0	249,196	17.2	60,174	58,146	5,650	39,243	191,050	19.5	8,590	7,159	9,143	4.34	1.07	31⅜-15⅛	5.5	
24. Athlone Industries, Inc.	1982	—	—	242,505	—	—	11,535	4.8	4,749	(1,927)	2,338	1.0	131,019	9.3	57,855	75,238	9,903	3,717	52,781	4.4	2,342	234	3,760	.91	1.60	28½-14⅜	18.3	24.
	1981	—	—	323,646	—	—	41,068	12.7	4,850	11,208	14,020	4.3	132,203	17.3	48,994	73,308	8,835	7,959	58,895	23.8	2,466	247	3,868	5.16	1.50	30-21⅜	5.5	
25. Carpenter Technology Corporation[28,29]	1982	—	—	487,964	182,218	37.3	64,417	13.2	13,099	17,814	33,162	6.8	341,670	9.8	145,305	53,308	342	62,139	288,362	11.5	8,614	44,522	18,084	3.85	2.10	50-30¼	8.1	25.
	1981	—	—	570,693	178,294	31.2	90,239	15.8	11,820	33,154	44,731	7.8	277,532	16.3	126,918	4,621	534	32,141	272,911	16.4	8,603	44,465	17,195	5.20	2.00	53-30⅛	9.6	
26. Eastmet Corporation	1982	—	—	215,976	—	—	(11,649)	(5.4)	6,749	(12,730)	(12,900)	6.0	122,448	(4.2)	55,203	59,967	7,232	5,923	62,481	—	4,876	4,876	—	(2.65)	—	11.50-3.50	—	26.
	1981	—	—	304,148	—	—	8,121	2.7	4,931	(2,988)	178	—	131,583	—	63,075	56,202	6,000	15,809	75,381	.2	4,876	4,876	4,388	.04	.90	16.00-11.25	—	
GRAND TOTAL	1982	74,577[2]	61,567[2]	50,800,587	16,673,983	32.8	484,798	1.0	2,429,376	(812,944)	(3,355,948)	—	33,647,012	—	4,964,511	14,952,757	1,652,544	4,203,805	17,368,861	—	—	—	—	—	—	—	—	
	1981	120,828[2]	87,014[2]	57,925,052	19,276,109	33.3	6,861,930	11.9	2,029,152	1,217,622	2,261,399	3.9	30,735,137	+10.1	8,561,526	9,271,991	825,531	3,415,035	20,551,677	—	—	—	—	—	—	—	—	
Percent change 1981 to 1982		−39	−30	−12.3	−13.5	—	−92.9	—	+19.7	—	—	—	+9.5	—	−42.0	+61.3	+100.2	+23.1	−15.5	—	—	—	—	—	—	—	—	

Parenthesis ( ) denotes loss or credit

N.A. indicates Not Available

Footnotes

1. Companies are ranked on basis of raw steel produced in 1982.
2. AISI figures for the whole industry.
3. Operating profit is income before depreciation, income taxes and interest on long-term debt.
4. Net income percent of investment is net income plus expense on funded debt divided by invested capital.
5. Stockholders' equity is total assets minus total liabilities.
6. USS—All 1982 figures include effect of Marathon Oil Company acquisition.
7. USS—Invested capital includes long-term debt, notes payable, minority interest, preferred stock of consolidated subsidiary, and preferred and common stock and net income reinvested in business.
8. Bethlehem—Results for 1982 include a non-recurring loss of $1,050,000,000 for restructuring of operations.
9. LTV—1981 results are reclassified for discontinued operations to conform with 1982 presentation.
10. LTV—Invested capital is defined as long-term portions of borrowings, leases, deferred income, deferred income taxes, minority interest, obligation to exchange debt for common stock, preferred stock with mandatory redemption and shareholders' equity.
11. LTV—Net income pct of investment and pct return on stockholders' equity—calculation for 1981 excludes the loss and shareholders' equity associated with the discontinued Wilson Meet and Food operations.
12. LTV—Common stock value—year-end market price ($11.375—1982; $16.375—1981) times outstanding shares of common stock.
13. Inland—Earnings per common share, 1982 includes extraordinary gain on early retirement of debt, $10,323 or 48¢ per share and cumulative effect of depreciation method change, $3,990 or 19¢ per share.
14. Armco—Operating profit, 1982 also excludes $460,300 in special charges recorded in 1982.
15. Wheeling-Pittsburgh—Net sales and operating revenues 1982 and 1981 includes $2,195,000 and $33,247,000 from the sales of tax benefits.
16. Wheeling-Pittsburgh— Net income 1982 includes $20,166,000 from the cumulative effect on prior years (to Dec. 31, 1981) of a change in accounting principle—depreciation.
17. Wheeling-Pittsburgh—Net income, 1981 includes $28,516,000 from the cumulative effect on prior years (to Dec. 31, 1980) of a change in accounting principle—LIFO.
18. Korf Industries—1982 figures for operating profit, depreciation, taxes, net income, invested capital, working capital, funded debt, and interest expense were not available at press time and hence not included in industry totals for 1982.
19. Korf Industries—1981 figures are restated for disposal of subsidiary.
20. Florida Steel—Fiscal year ends Sept. 30.
21. Florida Steel—1981 data restated to comply with FASB 43 (Accounting for Compensated Absences). The impact on fiscal '81 of this restatement is 4¢ per share.
22. Chaparral Steel—Unaudited financial data for the 12-month period ended Nov. 30. Fiscal year ends May 31.
23. Lukens—Provision for taxes 1982 and 1981 includes state and Federal taxes.
24. Interlake—Operating Profit—excludes minority interest (net of tax) of $1,210,000 in 1982 and $1,589,000 in 1981.
25. Interlake—Provision for Federal income taxes—1981 represents all taxes on income.
26. Interlake—Invested capital includes retained earnings.
27. Phoenix Steel Corp.—Net income (loss) for 1982 includes $3,245 favorable adjustment for cumulative effect through Dec. 31, 1981 for change in depreciation method.
28. Carpenter Technology—Fiscal year ends June 30.
29. Carpenter Technology—1981 invested capital, net income pct of investment, working capital, and stockholders' equity restated for adoption of Compensated Absence Accounting.

IRON AGE, May 2, 1983

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IRON AGE 1982 NONFERROUS INDUSTRY FINANCIAL ANALYSIS

( ) Denotes Loss or Credit

Dollar Values in Thousands

Company	Year	Net Sales and Operating Revenues 000 of $	Operating Profit 000 of $	Operating Profit as Percent of Sales	U.S. and Foreign Income Taxes 000 of $	Extraordinary Income (Loss) 000 of $	Net Earnings 000 of $	Net Earnings as Percent of Sales	Net Earnings for Common Share	Dividends Per Common Share	Number of Common Shares Outstanding at Year End	Stockholders Equity 000 of $	Net Earnings as Percent of Stockholders Equity	Funded and Other Long Term Dept 000 of $	Invested Capital 000 of $	Long Term Dept as Pct of Invested Capital	Net Earnings as Percent of Invested Capital	Working Capital 000 of $	Capital Spending 000 of $	Retained Earnings at End of Year 000 of $	
1. Alcan Aluminium Ltd.	1982	4,644,000	(12,000)	—	(9,000)	—	(58,000)	—	—	1.35	85,188,508	2,511,000	—	1,837,000	4,348,000	42.2	—	1,361,000	643,000	1,983,000	1.
	1981	4,978,000	441,000	8.8	142,000	—	264,000	5.3	3.24	1.80	82,651,633	2,631,000	10.0	1,612,000	4,243,000	37.9	6.2	1,486,000	974,000	2,154,000	
2. Aluminum Co. of America	1982	4,647,600	(204,900)	—	(144,100)	19,900	10,800	0.2	0.11	1.65	78,924,733	3,112,500	0.3	1,702,600	4,815,100	35.4	0.2	965,800	499,600	2,645,900	2.
	1981	4,977,482	327,600	6.6	90,100	—	296,187	6.0	3.97	1.80	74,458,330	3,136,700	9.8	1,381,896	4,518,564	30.6	8.3	950,430	677,800	2,765,200	
3. AMAX Inc.	1982	2,415,500	(42,900)	—	17,400	—	(390,100)	—	—	0.85	65,589,850	2,388,200	—	1,307,800	3,696,000	35.4	—	271,800	310,200	1,020,200	3.
	1981	2,799,400	452,500	16.2	138,500	—	230,800	8.2	3.31	2.40	63,089,388	2,805,900	8.4	1,234,700	4,040,600	30.6	5.7	485,900	609,300	1,487,900	
4. Asarco Inc.	1982	1,350,695	(94,087)	—	(11,803)	(35,376)	(74,080)	—	—	0.50	27,351,993	967,068	—	481,641	1,588,709	30.3	—	133,356	145,042	823,700	4.
	1981	1,531,506	9,552	0.6	6,136	—	50,038	3.3	1.54	1.40	26,025,146	1,018,783	3.8	388,113	1,546,896	25.1	2.5	154,951	162,888	929,385	
5. Brush Wellman Inc.	1982	193,900	34,246	17.7	12,590	—	11,060	5.7	1.27	0.80	8,538,463	132,212	8.5	64,671	196,883	32.9	5.6	71,000	16,168	111,739	5.
	1981	190,238	34,534	18.2	12,228	—	19,294	10.1	2.22	0.73	8,439,561	127,130	16.0	29,000	156,130	18.6	12.4	72,256	12,199	107,520	
6. Cominco Ltd.	1982	1,234,700	162,800	13.2	(43,000)	18,100	(31,200)	—	—	1.30	18,805,743	834,900	—	688,000	1,522,900	45.2	—	221,000	230,400	554,400	6.
	1981	1,416,900	346,700	24.5	50,800	5,600	70,300	5.0	3.35	4.10	18,802,718	854,500	8.2	566,700	1,421,200	39.9	4.9	292,000	333,700	622,300	
7. Engelhard Corp.	1982	2,018,885	78,940	4.0	6,468	—	64,811	3.2	2.41	0.56	26,907,000	411,522	15.7	65,844	477,366	13.8	13.6	189,000	61,316	410,465	7.
	1981	2,191,792	100,212	5.0	19,026	(5,210)	66,392	3.0	2.46	0.56	27,024,000	375,704	17.7	25,420	401,124	6.3	16.6	129,888	62,878	364,660	
8. Fluor Corp.	1982	7,336,700	285,200	3.9	132,400	—	152,800	3.9	1.94	0.80	78,328,000	1,776,400	8.8	1,009,900	2,786,300	36.2	5.5	53,000	525,900	680,300	8.
	1981	6,073,400	290,500	4.8	131,600	—	158,900	4.8	2.82	0.80	78,093,000	1,683,200	14.2	1,104,800	2,788,000	39.6	5.7	164,800	448,100	590,100	
9. Freeport-McMoRan Inc.	1982	747,888	82,880	11.1	5,876	—	65,946	8.8	0.95	0.60	69,817,000	735,130	9.1	481,027	1,216,157	39.6	5.4	61,072	479,768	586,071	9.
	1981	835,404	158,972	19.0	78,550	—	159,366	19.1	2.30	0.59	69,324,000	706,985	24.7	365,559	1,072,544	34.1	14.9	29,684	517,098	561,886	
10. Inco Ltd.	1982	1,235,983	(145,327)	—	(106,628)	—	(204,213)	—	—	0.20	90,343,000	1,511,635	—	1,129,293	2,640,928	42.8	—	746,788	95,290	839,952	10.
	1981	1,885,923	278,385	14.8	81,162	464,638	(469,518)	—	—	0.59	76,850,000	1,632,945	—	1,101,981	2,734,926	40.3	—	981,535	185,639	1,088,317	
11. Kaiser Aluminum & Chemical Corp.	1982	2,911,500	106,700	3.7	18,200	—	(115,000)	—	—	0.80	43,112,072	1,347,300	—	1,016,400	2,363,700	43.0	—	404,300	358,400	1,047,600	11.
	1981	3,225,500	402,300	12.5	8,000	—	132,900	4.1	3.08	1.40	43,071,933	1,497,400	8.9	908,100	2,405,500	37.8	5.5	323,500	463,000	1,197,800	
12. Martin Marietta Corp.	1982	3,526,506	73,536	2.1	200	—	91,642	2.6	2.92	1.92	16,916,562	436,560	11.2	1,234,587	1,671,147	73.9	5.5	241,929	390,568	1,066,264	12.
	1981	3,294,087	221,577	6.7	83,300	—	200,072	6.1	5.39	1.80	36,251,892	1,199,977	17.4	359,792	1,559,769	23.1	12.8	418,951	489,185	1,033,900	
13. Newmont Mining Corp.	1982	711,605	(24,626)	—	(18,666)	—	48,553	7.0	1.76	1.15	27,148,000	1,320,739	4.0	212,925	1,533,664	14.0	3.0	250,732	200,588	1,100,526	13.
	1981	903,096	59,682	7.0	26,353	294,556	375,593	42.0	14.30	2.55	27,028,000	1,303,618	29.0	139,058	1,442,676	10.0	26.0	319,240	184,846	1,083,873	
14. Noranda Mines Ltd.	1982	2,793,678	(124,947)	—	(65,980)	57,229	(82,944)	—	—	0.75	117,542,000	2,705,882	—	1,722,854	4,654,651	37.0	—	1,041,742	662,747	1,187,563	14.
	1981	2,944,350	175,776	6.0	59,415	59,027	164,806	5.6	1.33	1.40	116,088,000	2,869,412	5.7	922,315	4,078,315	22.6	4.0	867,032	596,455	1,388,180	
15. Olin Corp.	1982	1,823,137	113,537	6.2	1,605	(19,000)	53,308	2.9	2.26	1.20	23,638,000	805,185	6.7	293,285	1,098,470	26.7	4.9	323,585	139,015	669,488	15.
	1981	2,001,346	180,527	9.0	42,858	—	92,836	4.6	3.88	1.15	23,631,000	793,187	12.1	298,936	1,092,123	27.4	8.5	293,296	186,331	644,519	
16. Phelps Dodge Corp.	1982	957,795	33,089	3.5	(32,544)	—	(74,296)	—	—	0.30	21,760,706	977,991	—	667,212	1,693,493	39.4	—	162,992	100,077	823,239	16.
	1981	1,438,555	176,550	12.3	20,629	20,629	69,321	4.8	3.12	1.60	21,739,162	1,089,003	6.4	579,493	1,716,786	33.8	4.0	182,638	147,653	907,832	
17. Phibro-Salomon Inc.	1982	26,703,000	434,000	1.6	97,000	—	337,000	1.3	4.97	0.94	68,869,000	1,769,000	21.2	766,000	2,535,000	30.2	13.3	1,643,000	52,000	1,627,000	17.
	1981	26,655,000	298,000	1.2	9,000	—	289,000	1.1	4.23	0.94	68,097,000	1,477,000	21.2	827,000	2,304,000	35.9	12.5	1,320,000	74,000	1,354,000	
18. Reynolds Metals Co.	1982	2,980,900	(83,900)	—	(60,200)	31,400	7,700	0.3	0.26	1.75	19,811,167	1,373,100	0.6	890,600	2,263,700	39.0	0.3	569,600	157,500	1,085,000	18.
	1981	3,527,600	118,700	3.4	32,000	—	86,700	2.5	4.40	2.40	19,376,879	1,363,400	6.5	860,500	2,223,900	39.0	3.9	554,600	205,100	1,113,600	

Aluminum Co. of America: Net income for 1982 includes a nonrecurring gain of $19.9 million from exchange of common stock for sinking fund debentures, a real estate gain of $5.2 million and a $4.5 million charge for costs associated with permanent shutdown of a smelter in Texas. There also was a $2.8 million charge from sale and liquidation of properties and from early retirement incentives for eligible employees. Net income for the year also included inventory profits of $42.1 million.

Asarco Inc.: Liquidation of LIFO inventories resulted in an increase in pre-tax earnings of $10.6 million in 1982 and $6.3 million in 1981. Proceeds from tax leasing arrangements included in earnings before taxes on income were $9 million and $34 million for 1982 and 1981 respectively. Net for 1981 also included $10 million for recognition of investment tax credits. Pre-tax earnings also include an $11 million charge for estimated cost of closing two metal recycling plants and liquidation of the company's 80 pct interest in a solar collector manufacturer. Extraordinary charge of $35,376,000 cover a reserve for entire carrying value of company's 33 pct interest in Revere Copper and Brass Inc. Company exchanged common stock for debt securities in December 1982; combined effect of extraordinary items was a $35.4 million loss, net of $16.9 million in deferred tax credit. Net applicable to common shares was a $92,743,000 loss in 1982 and a $38,494,000 gain in 1981.

Brush Wellman Inc.: Net earnings from continuing operations were $18,547,000 in 1982 and $19,064,000 in 1981.

Cominco Ltd.: Canadian funds. Extraordinary gain for 1982 reflects sale of oil and gas properties. Extraordinary gain for 1981 reflects sale of interest in Pacific Coast Terminals Co. Ltd.

Engelhard Corp.: Dividend for 1981 reflects annualized rate. Company resulted from May 22, 1981 spinoff from Engelhard Minerals & Chemicals Corp. Retained earnings are stated before FAS #52 adjustments of ($12,007,000) in 1982 and $0 in 1981.

Freeport-McMoRan Inc.: Dividend payout for 1981 includes 14¢ paid before reorganization per share of Freeport-McMoRan common stock issued for Freeport Minerals Co.

Inco Ltd.: Net sales excludes "other income" of $41,010,000 in 1982 and $25,677,000 in 1981. Net from continuing operations were a $204,203,000 net loss in 1982 and net income of $20,467,000 in 1981.

Newmont Mining Corp.: Extraordinary gain of $294.6 million in 1981 represents gain on sale and exchange of St. Joe Minerals Corp. and Conoco Inc. stock net of applicable income taxes of $124.2 million.

Olin Corp.: Special charge of $19 million reflects provision for litigation settlement charged to earnings in fourth quarter, equal to $9.5 million after taxes. Stockholders equity for 1982 includes cumulative foreign exchange adjustment of $10,585,000 resulting from adoption of FAS #52.

Phelps Dodge Corp.: Operating profit is stated before depreciation, depletion, amortization and SGA expenses. Net per common share is after preferred dividend requirement. Invested capital includes redeemable preferred shares.

Phibro-Salomon Inc.: Salomon Brothers became part of the company Oct. 1, 1981 in a business combination accounted for as a purchase. Salomon Brothers had been accounted for by the equity method at year-end 1981 but was consolidated in 1982. Data for 1981 is restated to consolidate the accounts of Salomon Brothers.

Chilton's
JUNE 6, 1983

IRON AGE

THE MAGAZINE FOR METAL PRODUCING MANAGEMENT

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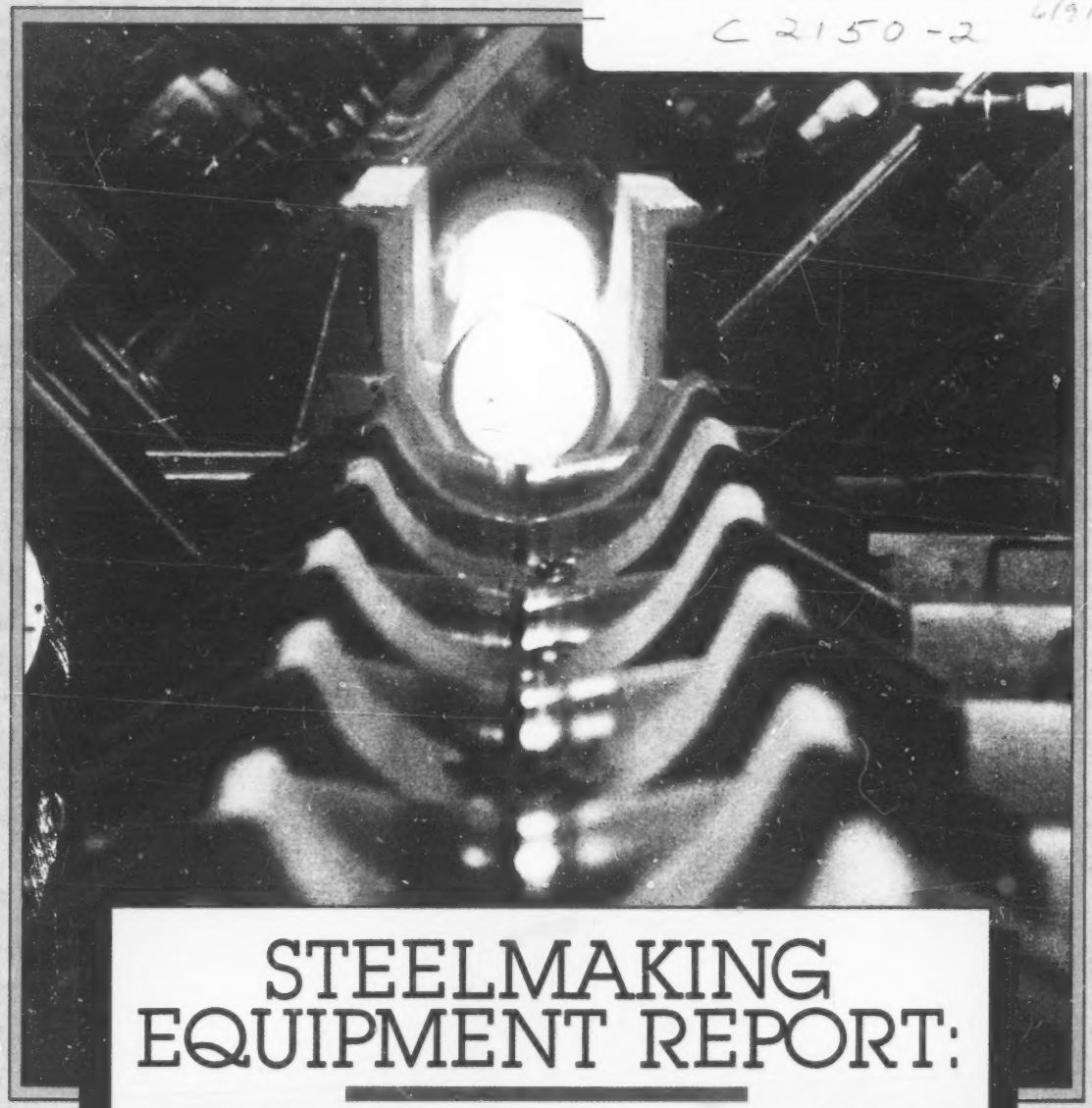


STEELMAKING EQUIPMENT REPORT:

WAITING FOR A TURN

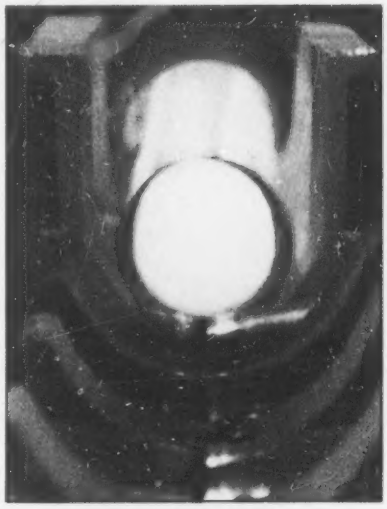
CHAPARRAL STEEL: TURNING A MINI-MILL INTO A MARKET MILL

RARITAN RIVER: THE MOUSE THAT'S ROARING

VOL. 226, NO. 16

IRON AGE

JUNE 6, 1983



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MP-6 STEEL'S EQUIPMENT SUPPLIERS AWAIT THE UPTURN
A market recovery could trigger the modernization push that will benefit steelmakers and their suppliers.

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MP-28 RARITAN RIVER: THE MOUSE THAT'S ROARING
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Minaturized Power Sources

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MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Steel Production, Composite Prices

(Effective May 23, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,697	1,701	30,759	33,615
Capability Utilization Rate	58.7	58.8	52.7	56.6

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.297
Pig Iron* * (Net ton= 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 67.50	$ 66.83	$ 66.83	$ 64.17
No. 2 bundles	$ 46.50	$ 46.50	$ 46.83	$ 45.50
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 68.50	$ 68.50	$ 68.50	$ 64.50
No. 1 steel, Philadelphia	66.50	64.50	64.50	66.50
No. 1 steel, Chicago	67.50	67.50	67.50	61.50
No. 1 bundles, Detroit	69.50	69.50	69.50	57.50
Low Phos., Youngstown	71.50	72.50	69.50	73.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	110.50
No. 1 mach'y cast., Chi	108.50	108.50	108.50	119.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Nonferrous Prices

(Effective May 23, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	82.50-84.00	81.50-84.00	5/10/83
Lead	20.00-23.00	21.00-23.00	5/4/83
Magnesium Ingot	134.00-138.00	134.00	5/16/83
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	4/27/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $215.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.55-$1.70
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $432.75
Indium, dollars per troy oz. $3.10
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$300-$320
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $12.77
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

May 16—606.27
May 17—605.99
May 18—607.44
May 19—606.18
May 20—607.50

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	79½	70¼
Yellow brass	67⅛	61⅛
Red brass	72⅞	65½
Comm. bronze	74⅝	67
Mang. bronze	65¼	63⅝
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	72
No. 2 copper wire	64
Light copper	55

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	68
No. 2 copper wire	60
Light copper	51
No. 1 composition	57
No. 1 comp. turnings	54
Hvy. yellow brass solids	38
Hvy. yellow brass turnings	30
Radiators	46

Aluminum

New mixed clips	41	—42
Old sheet	39	—40
Old cast	39	—40
Clean dry borings	39	—40

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	31	—33
Mixed L.C. clips	27	—28
Old sheets and cast	24	—25
Borings and turnings	16	—17
Duraluminum clippings	26	—27

Copper and Brass

No. 1 copper wire	61	—62
No. 2 copper wire	54	—55
Light copper	47	—48
Radiators	38	—39
No. 1 composition	48	—49
No. 1 composition turn'gs	45	—46
Cocks and faucets	34	—35
Clean heavy yellow brass	32	—33
Brass Pipe	33	—34
New soft brass clippings	48	—49

Lead

Heavy soft lead	10	—11
Whole batteries	4	— 5
Type metal	15	—16
Electrotype	15	—17

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	60	— 70

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

MATERIALS NEWSFRONT

(Effective May 23, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 68.00 to	$ 69.00
No. 2 hvy. melting	60.00 to	61.00
No. 1 dealer bundles	85.00 to	86.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	85.00 to	86.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	26.00 to	27.00
Cast iron borings	25.00 to	26.00
Low phos. punchings plate	88.00 to	89.00
Heavy turnings	60.00 to	61.00
No. 1 RR hvy. melting	76.00 to	77.00
Rails 2 ft. and under	95.00 to	96.00
Scrap rails, random lgth.	80.00 to	81.00
RR specialties	87.00 to	88.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	590.00 to	600.00
18-8 turnings	490.00 to	500.00

Chicago

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	60.00 to	61.00
No. 1 dealer bundles	81.00 to	82.00
No. 1 factory bundles (auto)	81.00 to	82.00
No. 2 dealer bundles	44.00 to	45.00
No. 1 busheling	75.00 to	76.00
Shredder scrap	75.00 to	76.00
Machine shop turn.	17.00 to	18.00
Mixed bor. and turn.	18.00 to	19.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	37.00 to	38.00
Low phos. forge crop	87.00 to	88.00
Low phos. punchings plate ¼ in. and heavier	94.00 to	95.00
Low phos. 2 ft. and under	89.00 to	90.00
No. 1 RR hvy. melting	79.00 to	80.00
Scrap rails, random lgth.	67.00 to	68.00
Reroller rails	93.00 to	94.00
Rails, 2 ft. and under	90.00 to	91.00
RR couplers and knuckles	77.00 to	78.00
RR car axles	109.00 to	110.00
No. 1 machinery cast	108.00 to	109.00
Cupola cast	93.00 to	94.00
Stove plate	92.00 to	93.00
Steel car wheels	79.00 to	80.00
Stainless		
18-8 bundles and solids	550.00 to	560.00
18-8 turnings	450.00 to	460.00
430 bundles and solids	135.00 to	140.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	$ 65.00 to	$ 68.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	76.00 to	79.00
No. 2 dealer bundles	42.00 to	45.00
No. 1 busheling	76.00 to	79.00
Shredder scrap	76.00 to	79.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	40.00 to	43.00
Low phos. 5 ft. and under	77.00 to	80.00
Low phos. 2 ft. punchings	89.00 to	92.00
Electric furnace bundles	93.00 to	96.00
RR specialties	80.00 to	83.00
Rails, 2 ft. and under	92.00 to	95.00
Cupola cast	58.00 to	61.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	45.00 to	46.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	66.00 to	67.00
Drop forge flashings	42.00 to	43.00
Machine shop turn.	25.00 to	26.00
Mixed borings and turn.	13.00 to	14.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	13.00 to	14.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	470.00 to	480.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	$ 64.00 to	$ 67.00
No. 2 hvy. melting	56.00 to	59.00
No. 1 dealer bundles	75.00 to	78.00
No. 2 dealer bundles	37.00 to	40.00
Machine shop turn.	1.00 to	3.00
Shoveling turnings	5.00 to	8.00
Low phos. plate	70.00 to	73.00
Electric furnace bundles	68.00 to	71.00
Galvanized bundles	58.00 to	61.00

Cleveland

No. 1 hvy. melting	$ 57.00 to	$ 60.00
No. 2 hvy. melting	27.00 to	30.00
No. 1 dealer bundles	71.00 to	74.00
No. 1 factory bundles	74.00 to	77.00
No. 2 bundles	22.00 to	25.00
No. 1 busheling	71.00 to	74.00
Machine shop turn.	1.00 to	4.00
Mixed bor. and turn.	1.00 to	4.00
Shoveling turnings	3.00 to	6.00
Cast iron borings	6.00 to	9.00
Cut structural & plates, 2 ft. and under	87.00 to	90.00
Low phos. punchings plate	87.00 to	90.00
Drop forge flashings	31.00 to	34.00
Foundry steel, 2 ft. & under	57.00 to	60.00
No. 1 RR hvy melting	61.00 to	64.00
Rails, 2 ft. and under	91.00 to	94.00
Rails, 18 in. and under	92.00 to	95.00
Steel axle turnings	67.00 to	70.00
Railroad cast	80.00 to	83.00
No. 1 machinery cast	87.00 to	90.00
Cupola cast	60.00 to	63.00
Stove plate	45.00 to	48.00
Stainless		
18-8 bundles	325.00 to	335.00
18-8 turnings	275.00 to	285.00
430 bundles	80.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 busheling	38.00 to	39.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.	9.00 to	10.00
Mixed bor. and turn.	16.00 to	17.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	15.00 to	16.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	50.00 to	51.00
Scrap rails, random lgth.	30.00 to	31.00
No. 1 machinery cast	71.00 to	72.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	47.00 to	48.00
Foundry steel, 2 ft.	47.00 to	48.00
No. 1 dealer bundles	58.00 to	59.00
No. 2 bundles	44.00 to	45.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	58.00 to	59.00
Rails, random length	61.00 to	62.00
Rails, 18 in. and under	76.00 to	77.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	82.00 to	83.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	96.00 to	97.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 64.00 to	$ 65.00
No. 2 heavy melting	59.00 to	60.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	63.00 to	64.00
Shredder scrap	77.00 to	78.00
Machine shop. turn.	24.00 to	25.00
Shoveling turnings	35.00 to	36.00
Cast iron borings	35.00 to	36.00
Electric furnace bundles	62.00 to	63.00
Elec. furnace, 3 ft. & under	59.00 to	60.00
Structural and plate, 2 ft.	76.00 to	77.00
Structural and plate, 4 ft.	73.00 to	74.00
No. 1 RR hvy. melting	63.00 to	64.00
Scrap rails, random lgth.	68.00 to	69.00
Rails, 18 in. and under	86.00 to	87.00
Angles and splice bars	76.00 to	77.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	59.00 to	60.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 48.00 to	$ 49.00
No. 2 hvy. melting	48.00 to	49.00
No. 1 dealer bundles	53.00 to	54.00
No. 2 bundles	27.00 to	28.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	8.00 to	9.00
Cast iron borings	11.00 to	12.00
Low phos. 18 in. and under	72.00 to	73.00
Rails, random length	54.00 to	55.00
Rails, 2 ft. and under	74.00 to	75.00
No. 1 cupola cast	58.00 to	59.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	67.00 to	68.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	480.00 to	500.00
18-8 turnings	380.00 to	400.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	40.00 to	42.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	40.00 to	42.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 42.00 to	$ 44.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	13.00 to	15.00
Machine shop turn.	6.00 to	8.00
Cast iron borings	6.00 to	8.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	30.00 to	32.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 dealer bundles	10.00 to	12.00
Machine shop turn.	6.00 to	8.00
Shoveling turnings	10.00 to	12.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under (foundry)	86.00 to	88.00
No. 1 cupola cast	88.00 to	90.00

Seattle

No. 1 hvy. melting	$ 60.00 to	$ 62.00
No. 2 hvy. melting	49.00 to	51.00
No. 2 bundles	39.00 to	41.00
No. 1 cupola cast	94.00 to	96.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 55.00
No. 2 heavy melting cut 2 ft. and under	52.00
No. 1 dealer bundles	60.00
No. 2 bundles	30.00
Mixed steel scrap	34.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	25.00
Short steel turn.	28.00
Mixed bor. and turn.	15.00
Cast scrap	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	34.00 to	36.00
Machine shop turn.	19.00 to	20.00
Crushed turnings	35.00 to	37.00
Shredder scrap	67.00 to	68.00
Cut structural plate 2 ft. and under	84.00 to	86.00
Unstripped motor blocks	58.00 to	60.00
Cupola cast	71.00 to	73.00

STEEL PRICES

Codes identify Producers listed in the Key on page 59. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10, U1	$453.00
R3	$453.00
Midwest	
R3, U1, W5	$453.00
S1	$453.00
C10	$453.00
K2	$453.00
W5	$453.00
West	
B3(2)	$463.00
C6	$453.00
South	
A7	$453.00
Alloy, East	
R3, C10	$492.00
B3	$492.00
Midwest	
W8, W5, C10	$492.00
S1, U1	$492.00
R3	$492.00
West	
B3	$502.00
C6	$469.00
South	
A7	$492.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7	24.15
C20	22.90
W8	22.90
I3, T10, U1, N4	23.90
West	
C6	25.10
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	23.90
W8	24.15
U1	23.90
I3	23.90
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	23.90
I3	23.90
West	
U1	24.40
C6	24.15
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut II Edge—all widths, East	
B3, U1	22.05
J3	22.05
Midwest	
A7, D1	22.05
I4	21.45
S1, J3, D1	22.05
W3	22.05
N4	22.55
W5	22.05
U1	22.05
B3, G2, I3, M2, R3, G3	22.05
West	
K1	20.80
B3	24.70
South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
R7, S10, B4	29.60
P15	24.80
S7	Cmp*
U1	35.30
D1(1)	Cmp*
B4	31.55
Midwest	
G4	24.80
I4	35.30
W14	22.95
S1, J4	34.05
T4	Cmp*

*Composite pricing

West	
U1	33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, (plus extras)*	
Midwest	
M2, G3, R3, W3, I4, J3, G2, I3	22.05
A7	22.05
S1	22.05
West	
K1	22.05
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	24.60
G4	25.80
I4	23.70
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	42.60
P15	32.10
Midwest	
I4	41.80
S1	42.30

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	22.05
J3	22.05
U1	22.05
Midwest	
A7, U1, B3, G2, G3, I3, M2, R3, W3	22.05
S1, W5, D1	22.05
J3	22.05
I4	21.15
West	
U1	21.30
K1	22.05
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2), U1	26.15
J3	26.15
Midwest	
B3, I3, G3, R3, M2, U1(2)	26.15
G2, W3, M11	26.15
I4	22.00
J3, A7	26.15
S1, W5, D1	26.15
West	
U1	26.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2), U1	28.00
Midwest	
J3, D1	28.00
I3, W5, S1	28.00
U1, A7, R3, Y1	28.00
G2, W3, M11	28.00
West	
K1	27.15
U1	28.50
South	
U1	28.00
R3	28.00
Enameling, Midwest	
A7, I3, U1, J3	27.65
S1	26.50
Long-Terne, Midwest	
W5	28.30
A7, U1	29.35
R3	29.35

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
B3	23.25
South	
G7	22.35

Tinplate

Electrolytic Tinplate	
Single Reduced (70 lb)	
East	per base box
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$26.79
U1	26.79
South	
U1	$26.29
Double Reduced (55 lb)**	
Midwest	
M11 (50 lb)	$21.45
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$21.99
U1	21.99
South	
U1	$21.49
Black Plate	
Single Reduced (75 lb)*	
East	
B3	$24.01
Midwest	
J3	$24.01
M11	24.01
I3, U1, W5	24.01
W3	24.01
West	
K1	$24.01
U1	23.36
Double Reduced (55 lb)	
East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

*70 lb—base weight extra 45¢
**50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3	25.80
R5	25.80
B3(3), J3	25.80
U1, C10	25.80
Midwest	
A7	23.95
U1, I3, I4, C20, N4	25.80
R3, T10	25.80
K2	25.80
I3	19.50*
West	
B3	25.80
C6	24.45
B3	24.70
South	
A8	20.65
A7	25.80
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
C21	21.15
J3(4), L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	31.00
M1	23.025
B4, C10	31.00
Midwest	
B5, W10, Y1, W8, R3	33.25
J3	31.00
B1	19.80
L2	30.75
N9	31.00
P3	19.85+CMS
W14	22.20
J3(3)	31.00
B5	31.25
J3	31.00
West	
B5	31.20
B5	34.90
R3	37.15
South	
B5	32.85
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10, U1	27.95
R3	27.95
J3	27.95
Midwest	
A7, U1, R3	27.95
I3, C10	27.95
I4	24.85
I3	21.00*
West	
B3	27.95
B5	18.50
C6	26.60
B3	27.10
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	37.90
M1	28.025
R4	25.65
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	34.25
Midwest	
B5, R3, C10	37.35
C2	28.275
J3, M9, W10	34.85
P3	22.75
B1	22.70
N9	34.85
L2	34.65
B5	35.10
J3	36.00
J3	34.85
West	
R3	40.75
B5	35.20
B5	38.25
South	
J3	35.85
C16	28.00
B5	36.75

Plates

Carbon Steel, East	
B3(2), U1	25.75
L4	25.75
P2	25.75
J3	26.75
Midwest	
B3, R3, S1	25.75
I3	24.25
J3, A7	22.80
U1, I4	25.75
R3	26.75
West	
A7, B3, C6, O2	24.25
K1	23.50
U1	25.75
South	
R3	25.75
A7	25.75
U1	25.75
Alloy, East	
B3, J3	33.55
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	33.55
G2, G3	33.55
I4, U1	33.55
West	
B3	33.55
O2	30.55
K1	31.30
South	
A7	27.55

Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
U1	27.70
A7, R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
A7	25.95
C6	24.95

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
City Delivery Charge*	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	21.50	27.34	30.57	31.16	22.87	24.68	17.11	31.65	42.10	52.60	69.58	73.19
Baltimore	27.73	26.59	34.60	36.75	25.30	28.64	18.94	36.44	55.85	59.91	69.79	76.32
Birmingham	21.20	27.48	30.66	31.63	22.73	24.36	16.92	31.57	49.31	68.90	68.16	74.43
Boston	24.28	28.00	33.94	44.44	37.16	37.52	20.68	40.96	48.40	52.69	62.29	67.33
Buffalo	28.17	33.76	39.72	43.01	34.96	28.77	17.57	40.86	39.03	48.82	56.33	64.06
Chicago	22.53	27.93	31.22	33.65	24.20	26.21	15.74	31.00	35.14	39.05	44.41	50.25
Cincinnati	24.03	28.04	32.58	34.04	25.06	28.78	15.00	30.33	35.17	40.02	45.20	51.15
Cleveland	26.57	31.04	33.35	32.65	27.23	28.47	15.55	32.90	36.23	41.57	46.44	52.48
Denver	32.01	38.28	36.73	41.26	36.46	35.59	21.15	44.51	51.78	59.12	67.62	75.96
Detroit	24.29	30.15	31.72	36.37	28.87	34.81	19.22	38.22	35.65	39.68	56.96	51.26
Houston	23.32	29.62	33.90	41.35	34.12	38.36	17.62	39.25	39.28	45.22	53.75	60.10
Kansas City	24.43	28.21	31.43	30.53	30.66	33.35	17.37	34.33	42.43	51.71	57.20	64.82
Los Angeles	30.05	33.60	39.14	45.92	37.83	38.95	33.49	50.38	62.24	72.74	78.34	88.90
Memphis	27.30	34.46	35.72	36.37	28.87	34.81	19.22	35.22	52.82	56.96	67.85	77.44
Milwaukee	23.40	30.52	33.14	32.33	25.23	28.96	15.39	34.80	35.61	41.88	46.30	53.45
New York	23.60	28.46	32.55	42.75	31.67	33.54	19.44	41.89	46.59	53.04	62.17	69.31
Philadelphia	27.46	33.12	36.20	46.29	32.68	35.97	19.45	39.41	46.41	52.66	62.06	69.23
Pittsburgh	25.68	30.43	34.47	41.36	34.34	29.51	20.40	41.06	46.51	54.05	61.11	68.86
Portland	29.67	37.16	41.51	33.10	34.82	38.20	33.64	56.85	61.00	64.10	78.49	....
San Francisco	29.58	36.18	40.25	45.78	38.70	39.18	27.12	51.14	63.09	72.30	78.49	86.10
Seattle	29.85	35.14	38.44	46.76	32.89	35.32	31.48	51.38	64.02	70.14	73.83	87.67
Spokane	21.08	30.56	33.56	36.69	35.18	25.16	20.32	41.00	42.02	46.30	....	58.32
St. Louis	24.45	29.30	33.56	35.43	28.84	29.68	15.88	32.95	38.46	43.65	51.02	57.48
St. Paul	23.96	28.55	32.40	35.20	27.86	28.12	15.25	34.13	36.60	41.88	46.58	53.31

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ¾-2¹⁵/₁₆; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1⅝" round; Cold drawn—1" round; Hot-rolled 4140—1⅝" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

METALWORKING PRICE TRENDS

Prices: Down and down they go

The great price sag continued through April. Prices of producer finished goods fell by 0.1 pct from March. This marked the third month of price decline over the first four months of the year.

Through the four-month period, these prices, at an annual rate, fell by 3.7 pct. That's the longest trend of falling prices since the 1960s.

The overall producer finished goods price decline in April obscured some strong crosscurrents. Energy prices fell by 2.8 pct; food prices rose by 1.2 pct.

Too, prices of metalworking goods followed closely the overall downtrend in April tags. The 22 key metalworking product lines shown on the table here had a fractional decline for the month. And, as was true for the larger price picture for the month, there were price contrasts in the movement of metalworking tags. Miscellaneous metal products showed a 1.6 pct price decline for the month, while prices of industrial process furnaces rose by 0.8 pct.

Much of the cross-movement in prices in April centered on capital equipment lines. Overall, the producer price index for capital equipment declined by 0.3 pct on a seasonally adjusted basis. Most of this price decline was due to lower tags on new autos.

Softer prices were also scored in April for machine tools, railroad equipment and mining machinery. And pulling on the up-side on prices were those for agricultural machinery, aircraft, generators and transformers.

The good news on prices—which is not so good where lower tags are eating into profits—is likely to be shaded in coming months. After all, the great price sag seen so far this year is largely the handiwork of the recession.

Very predictably, as business activity picks up further, the price-depressant effect of the recession will fade away. Then, hotter market demand will start to push up tags.

Still, nobody is saying that all-out inflation will be roaring back onto the scene. Productivity is improving strongly, wage demands have moderated and foreign competition remains intense. One economist, who has a good price forecasting record, is predicting a 1 pct rise in the producer price index for all of this year. That would be the smallest increase since 1964.

Too, profits can continue to improve in the face of all this price softness because of lower breakeven points achieved by companies during the recession.

Latest Month Covered: April, 1983

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	375.5	+ 0.2	+ 1.9
Metal Forming Machine Tools	414.8	+ 0.1	+ 3.9
Agricultural Machinery & Equip.	324.8	+ 0.6	+ 5.9
Construction Machinery & Equip.	350.8	+ 0.3	+ 2.7
Industrial Process Furnace & Ovens	361.2	+ 0.8	+ 3.4
Industrial Material Handling Equip.	284.8	− 0.1	− 1.2
Pumps, Compressors & Allied Equip.	347.8	0	− 0.1
Fluid Power Equip. (Dec. 1970 = 100)	251.3	− 0.1	+ 4.1
Mechanical Power Transmission Equip.	314.8	+ 0.1	+ 1.1
Automobiles	216.5	− 1.1	+ 3.3
Motor Trucks—Light	270.1	− 1.2	+ 6.3
Motor Trucks--Heavy	317.6	0	+ 5.5
Railroad Equipment	357.2	− 0.1	+ 4.0
Fabricated Metal Structural Products	302.6	− 0.4	− 0.9
Electric Motors	303.2	+ 0.1	+ 3.5
Valves (Metal, Ex-Fluid Power—Dec. 1982=100)	100.3	+ 0.3	NA
Ball & Roller Bearings	331.2	0	− 0.8
Cutting Tools & Accessories	274.7	+ 0.5	+ 1.1
Heating Equipment	242.3	+ 0.5	+ 2.7
Plumbing Fixtures & Brass Fittings	287.5	+ 0.7	+ 2.6
Metal Containers	332.0	+ 0.1	+ 0.6
Miscellaneous Metal Products	285.3	− 1.6	+ 2.0

Data based on U.S. Labor Dept.'s Producer Price Index

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JUNE 15, 1982

IRONAGE

THE MAGAZINE FOR METALWORKING MANAGEMENT

C6150-2 4/23/82

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JUNE 15, 1983

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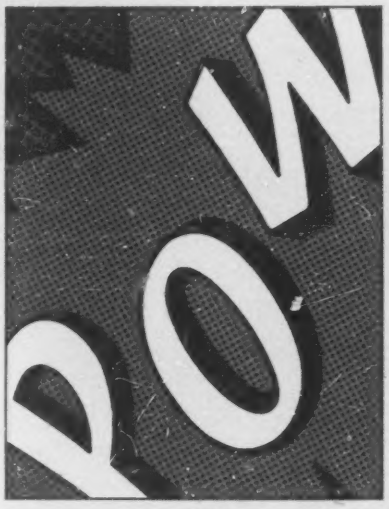

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SCRAP MONITORING WON'T BE SCRAPPED

When Congress reconsiders the Export Administration Act this month, the scrap export provision is expected to remain in the law.

BY ROBERT J. REGAN

Whatever else Congress may soon do to the Export Administration Act, the odds are that the hotly contested provisions providing for monitoring and control of iron and steel scrap exports will still be in that law—though probably more tightly defined.

There had been a wide range of differences of opinion on the scrap exports provision, known alternately as the Findley Amendment and Section 7c. But the mills of Congress by late May had ground these down to largely procedural matters.

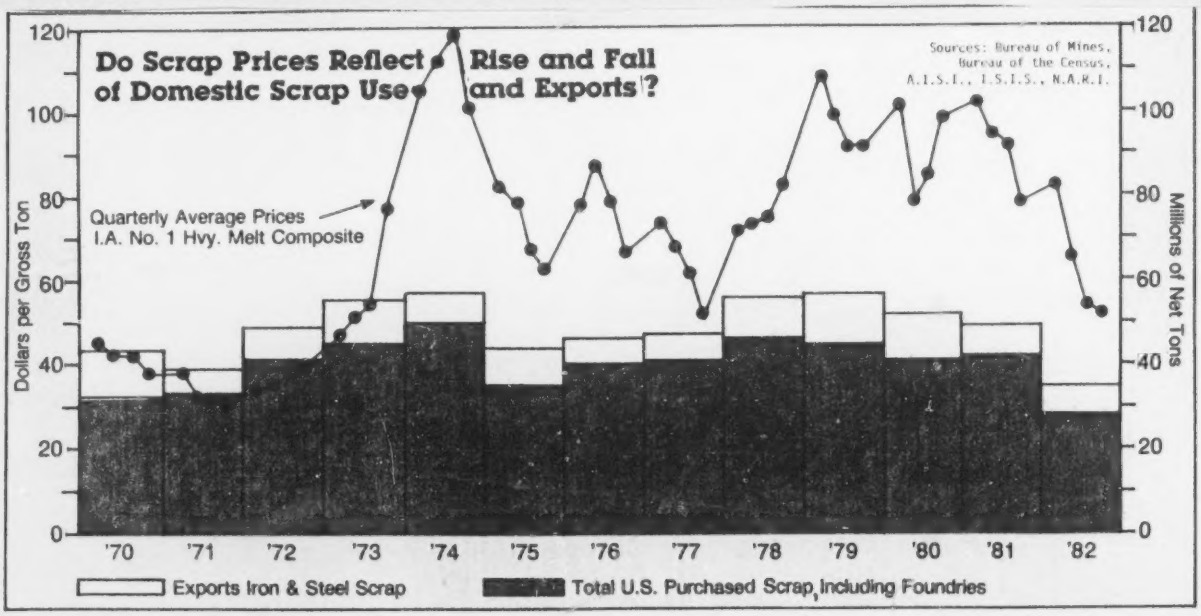
The National Association of Recycling Industries (NARI) failed in its attempt to get Section 7c knocked out altogether, largely on grounds that it discriminated against scrap and made no provision for similar treatment for exports of primary metals.

Other combatants included the Institute of Scrap Iron and Steel (ISIS). Its position has evolved into favoring stricter guidelines under which the Secretary of Commerce can invoke the provision. The Ferrous Scrap Consumers Coalition (FSCC) is still the strongest backer of the Findley Amendment. The American Iron & Steel Institute, which also favors export monitoring, has been quieter than the others during the current fracas.

The scrap market itself isn't putting much pressure on the situation. Demand is improving slowly, but export volume in the first quarter wasn't much better than last year's lackluster performance. The Department of Commerce puts first quarter exports at 1.56 million tons for a 2.4 pct gain on the same 1982 period. Japan and South Korea were strong buyers (up 111.2 pct and 50.1 pct, respectively), but the gains here were pared down by sharp drops in shipments to customers in Canada, Spain, Mexico and Italy.

Since 1970, scrap prices appear to respond more to increases in overall demand (domestic industry purchases plus exports) than to any move by exports alone (see chart). The scrap industry argues that there is plenty of scrap available for domestic and overseas requirements. (ISIS President James F. Anderton late in May reminded steel executives attending at the AISI annual meeting in New York that

(Cont. on p. 33)



Iron Age Composite Price, No. 1 Hvy. Melt Avg. Dollars per Gross Ton, by Quarters

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
1st Qtr.	43.50	39.14	34.71	48.36	104.35	80.76	79.76	72.67	72.30	109.35	101.95	101.10	81.11
2nd Qtr.	42.42	33.69	35.33	51.35	110.04	78.30	86.67	66.38	74.25	99.51	79.82	95.51	64.01
3rd Qtr.	41.08	32.48	37.31	55.94	119.24	67.08	79.10	60.48	75.50	91.51	84.98	91.74	56.02
4th Qtr.	37.25	31.05	40.21	76.14	100.44	61.32	65.65	53.06	82.72	91.30	98.66	77.74	51.77

(Cont. from p. 29)

they have a 700 million-ton hoard to draw from.) But domestic scrap consumers alternately question the utility value of this cornucopia and which end of it the scrap comes out of.

Possibly sensitive to questions over the processors' ability to deliver from the scrap hoard, ISIS late in May stated flatly that the ferrous scrap industry can produce 140 million tons of material a year working on a two-shift basis. On a one-shift basis, ISIS continued, the scrap industry can shread, shear, bale, crush, break and torch 70 million tons of scrap a year.

It would appear that even the one-shift total would be enough. The total requirement (domestic purchases plus exports) didn't quite hit 60 million tons during the peak demand year of 1974—when export controls were in force. On the other hand, scrap prices have moved up quickly each time the 60 million ton-mark is approached. And, price, more than volume, is the real name of the game in the monitoring and controls controversy.

Oddly enough, scrap prices also peaked in 1974 despite a 21.8 pct drop in exports (thanks to the controls, which apparently failed to create a two-tier market that some domestic consumers had been hoping for).

According to Hershel Cutler, executive director of ISIS, "the theory was that, if you controlled exports, the prices would come down, but as you see, it didn't work out that way. The intent was based on an emotional response (to record export volume the year before), but what we got were artificially inflated prices."

The two-tier idea didn't work, he says, because domestic demand was up and domestic users still had to match bid-up prices of overseas buyers competing for the artificially reduced supply of U.S.-generated scrap. As long as domestic scrap processors thought they could get at least a piece of the export action, they weren't receptive to lower domestic prices, Mr. Cutler says.

One of the engines driving up domestic scrap consumption is the fast growth in steel production in electric furnaces, which use scrap as the principal raw material. Between 1970 and 1981, domestic steel production in electric furnaces rose by 69.4 pct, or nearly 14 million tons, according to AISI. Over the same period, total steel production in basic oxygen and open hearth furnaces dropped 22.2 pct, or nearly 24.7 million tons.

Although production by all furnace types was down sharply in 1982, production in electric furnaces increased its share of total output to a peak 29.5 pct. Back in 1970, this share was only 15.3 pct.

AISI, noting that the growth in electric furnace use in Japan rivals that in the U.S., has contended that there have been periods in which the combination of domestic and export demand have forced "inflationary increases in scrap prices (which) appear to be occurring with greater frequency at lower levels of U.S. steel production."

AISI said the Department of Commerce must have the power to monitor exports "and contracts for future exports" when it appears the volume in relation to domestic supply contributes or could contribute to an increase in domestic prices or have an adverse impact on the domestic supply.

But Steven Kaplan, first vice president of ISIS, has contended that foreign buyers could view the monitoring process as a prelude to controls, boost their orders to get on the books before controls are clamped on and create a self-fulfilling prophecy.

Price, more than volume, is the real name of the game in the controversy.

The ISIS goal in the current campaign centers on a ban on short supply controls without first requiring the Secretary of Commerce to hold formal on-the-record proceedings and a formal administrative hearing process and a final agency decision on the record before imposition of monitoring or controls.

NARI's argument, according to M. J. Mighdoll, its executive vice president, was that "any emergency of critical short supply situation necessitates export control action on all forms of the metal in short supply, not just the scrap form."

"The original proposal in Congress in 1979 was to do just that, which was why NARI did not initially oppose its inclusion in the Export Administration Act," Mr. Mighdoll said.

NARI believes the provision is unnecessary and counterproductive, he said, but added that the association would have no objection if it had been applied to all commodities.

Reminded that NARI had charged that Section 7c "does nothing more than seek to establish monopolistic control over prices and supplies of metal scrap," Mr. Mighdoll was asked if NARI meant monopolistic controls for domestic primary and secondary producers of ferrous and nonferrous metals, or governmental monopolistic control per se? He replied that it was "apparent that some domestic consumers have been and continue to be eager to have such a special control mechanism, yet they do not suggest, nor will they willingly agree to accept, that the same provision be applicable to the virgin forms of metal.

"It should be obvious that if scrap is more controllable than primary metal it will help assure priorities in the marketplace for primary metals. And, most importantly, if scrap is placed under quantative export control restrictions, the availability of scrap becomes more plentiful and the consumer, who establishes market prices, can then benefit from the absence of foreign competition for the metal. As a result, he enjoys 'monopolistic' control, he has improved his market position by weakening the price structure and distorting normal flow relationships through artificially introduced government intervention."

Asked if NARI was not over-reacting when it charged that any company or organization could trigger a comprehensive investigation and a series of hearings leading to possible imposition of monitoring without a filtering process to protect the government and the taxpayer from nuisance petitions and the like, Mr. Mighdoll said there are evaluations to be made by the Commerce Department, but "the very fact that a petition can trigger lengthy and costly investigative proceedings has a negative effect on markets."

Mr. Mighdoll said the fact that scrap metals alone are subject to possible monitoring and/or control procedures "is, in itself, an inhibiting factor in the marketing of scrap metals—and as for the 'any company' part of the question, it is hard to imagine the pressure that a giant steel company, albeit only one company, can exert politically behind its petition. A few of them did it in 1980."

Even after narrowing its focus to nonferrous scrap, NARI lost its bid to knock out the Findley Amendment in the Senate Building, Housing and Urban Affairs Committee and the House Foreign Affairs Committee late last month. An amendment supported by ISIS was passed on the House side unanimously at the same time.

NARI would not discuss what further action or recommendations, if any, it might make, but a spokesman said the association stands on its position against the Findley amendment, of which Mr. Mighdoll said "there is no such thing as 'revised' discrimination; it should be eliminated completely." □

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MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82, Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective May 31, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,627	1,697	32,386	34,994
Capability Utilization Rate	56.3	58.7	52.9	56.1

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.297
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 70.50	$ 67.50	$ 66.83	$ 62.83
No. 2 bundles	$ 46.50	$ 46.50	$ 46.50	$ 45.50
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh .	$ 71.50	$ 68.50	$ 68.50	$ 64.50
No. 1 steel, Philadelphia	68.50	66.50	64.50	64.50
No. 1 steel, Chicago.....	71.50	67.50	67.50	59.50
No. 1 bundles, Detroit..	69.50	69.50	69.50	57.50
Low Phos., Youngstown	71.50	71.50	72.50	71.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	110.50
No. 1 mach'y cast., Chi..	108.50	108.50	108.50	108.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective May 31, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	81.00-82.00	81.00-84.00	5/24/83
Lead	20.00-23.00	21.00-23.00	5/4/83
Magnesium Ingot	138.00	134.00-138.00	6/1/83
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	4/27/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $215.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.55-$1.70
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $437.50
Indium, dollars per troy oz. $3.10
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$300-$310
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $13.32
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

May 23—606.38
May 24—606.94
May 25—610.75
May 26—614.97
May 27—Holiday

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	79½	70¼
Yellow brass	67⅛	61⅛
Red brass	72⅞	65½
Comm. bronze	74⅝	67
Mang. bronze	65¼	63⅝
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	71
No. 2 copper wire	63
Light copper	54

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	67
No. 2 copper wire	59
Light copper	50
No. 1 composition	57
No. 1 comp. turnings	54
Hvy. yellow brass solids	38
Hvy. yellow brass turnings	30
Radiators	46

Aluminum

New mixed clips	42	—43
Old sheet	39	—40
Old cast	39	—40
Clean dry borings	39	—40

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	32	—33
Mixed L.C. clips	28	—29
Old sheets and cast	25	—26
Borings and turnings	17	—18
Duraluminum clippings	27	—28

Copper and Brass

No. 1 copper wire	61	—62
No. 2 copper wire	54	—55
Light copper	48	—49
Radiators	38	—39
No. 1 composition	48	—49
No. 1 composition turn'gs	45	—46
Cocks and faucets	34	—35
Clean heavy yellow brass	32	—33
Brass Pipe	33	—34
New soft brass clippings	48	—49

Lead

Heavy soft lead	9	—10
Wrought batteries	3	— 4
Type metal	15	—16
Electrotype	14	—15

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	50	— 60

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

EFFECTIVE MAY 31, 1983

MATERIALS NEWSFRONT

(Effective May 31, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	61.00 to	62.00
No. 1 dealer bundles	86.00 to	87.00
No. 1 factory bundles (auto)	86.00 to	87.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	86.00 to	87.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	26.00 to	27.00
Cast iron borings	25.00 to	26.00
Low phos. punchings plate	88.00 to	89.00
Heavy turnings	61.00 to	62.00
No. 1 RR hvy. melting	88.00 to	89.00
Rails 2 ft. and under	103.00 to	104.00
Scrap rails, random lgth.	88.00 to	89.00
RR specialties	94.00 to	95.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	590.00 to	600.00
18-8 turnings	490.00 to	500.00

Chicago

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	84.00 to	85.00
No. 1 factory bundles (auto)	84.00 to	85.00
No. 2 dealer bundles	44.00 to	45.00
No. 1 busheling	82.00 to	83.00
Shredder scrap	81.00 to	82.00
Machine shop turn.	17.00 to	18.00
Mixed bor. and turn.	18.00 to	19.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	37.00 to	38.00
Low phos. forge crop	89.00 to	90.00
Low phos. punchings plate ¼ in. and heavier	98.00 to	99.00
Low phos. 2 ft. and under	93.00 to	94.00
No. 1 RR hvy. melting	84.00 to	85.00
Scrap rails, random lgth.	72.00 to	73.00
Reroller rails	98.00 to	99.00
Rails, 2 ft. and under	94.00 to	95.00
RR couplers and knuckles	82.00 to	83.00
RR car axles	112.00 to	113.00
No. 1 machinery cast	108.00 to	109.00
Cupola cast	95.00 to	96.00
Stove plate	94.00 to	95.00
Steel car wheels	82.00 to	83.00
Stainless		
18-8 bundles and solids	550.00 to	560.00
18-8 turnings	450.00 to	460.00
430 bundles and solids	135.00 to	140.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	80.00 to	83.00
No. 2 dealer bundles	42.00 to	45.00
No. 1 busheling	80.00 to	83.00
Shredder scrap	77.00 to	80.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	40.00 to	43.00
Low phos. 5 ft. and under	79.00 to	82.00
Low phos. 2 ft. punchings	89.00 to	92.00
Electric furnace bundles	93.00 to	96.00
RR specialties	81.00 to	84.00
Rails, 2 ft. and under	92.00 to	95.00
Cupola cast	58.00 to	61.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	51.00 to	52.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	67.00 to	68.00
Drop forge flashings	42.00 to	43.00
Machine shop turn.	25.00 to	26.00
Mixed borings and turn.	17.00 to	18.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	17.00 to	18.00
Heavy breakable cast	36.00 to	37.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	470.00 to	480.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	$ 64.00 to	$ 67.00
No. 2 hvy. melting	58.00 to	59.00
No. 1 dealer bundles	75.00 to	78.00
No. 2 dealer bundles	37.00 to	40.00
Machine shop turn.	1.00 to	3.00
Shoveling turnings	5.00 to	8.00
Low phos. plate	70.00 to	73.00
Electric furnace bundles	68.00 to	71.00
Galvanized bundles	58.00 to	61.00

Cleveland

No. 1 hvy. melting	$ 57.00 to	$ 60.00
No. 2 hvy. melting	27.00 to	30.00
No. 1 dealer bundles	71.00 to	74.00
No. 1 factory bundles	74.00 to	77.00
No. 2 bundles	22.00 to	25.00
No. 1 busheling	71.00 to	74.00
Machine shop turn.	1.00 to	4.00
Mixed bor. and turn.	1.00 to	4.00
Shoveling turnings	3.00 to	6.00
Cast iron borings	6.00 to	9.00
Cut structural & plates, 2 ft. and under	92.00 to	95.00
Low phos. punchings plate	92.00 to	95.00
Drop forge flashings	31.00 to	34.00
Foundry steel, 2 ft. & under	57.00 to	60.00
No. 1 RR hvy melting	61.00 to	64.00
Rails, 2 ft. and under	97.00 to	100.00
Rails, 18 in. and under	98.00 to	101.00
Steel axle turnings	67.00 to	70.00
Railroad cast	80.00 to	83.00
No. 1 machinery cast	87.00 to	90.00
Cupola cast	60.00 to	63.00
Stove plate	45.00 to	48.00
Stainless		
18-8 bundles	325.00 to	335.00
18-8 turnings	275.00 to	285.00
430 bundles	80.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 busheling	38.00 to	39.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.	9.00 to	10.00
Mixed bor. and turn.	16.00 to	17.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	15.00 to	16.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	50.00 to	51.00
Scrap rails, random lgth.	30.00 to	31.00
No. 1 machinery cast	71.00 to	72.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	47.00 to	48.00
Foundry steel, 2 ft.	47.00 to	48.00
No. 1 dealer bundles	58.00 to	59.00
No. 2 bundles	44.00 to	45.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	58.00 to	59.00
Rails, random length	61.00 to	62.00
Rails, 18 in. and under	76.00 to	77.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	82.00 to	83.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	96.00 to	97.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 64.00 to	$ 65.00
No. 2 heavy melting	59.00 to	60.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	63.00 to	64.00
Shredder scrap	77.00 to	78.00
Machine shop. turn.	24.00 to	25.00
Shoveling turnings	35.00 to	36.00
Cast iron borings	35.00 to	36.00
Electric furnace bundles	62.00 to	63.00
Elec. furnace, 3 ft. & under	59.00 to	60.00
Structural and plate, 2 ft.	76.00 to	77.00
Structural and plate, 4 ft.	73.00 to	74.00
No. 1 RR hvy. melting	63.00 to	64.00
Scrap rails, random lgth.	68.00 to	69.00
Rails, 18 in. and under	86.00 to	87.00
Angles and splice bars	76.00 to	77.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	59.00 to	60.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 48.00 to	$ 49.00
No. 2 hvy. melting	48.00 to	49.00
No. 1 dealer bundles	53.00 to	54.00
No. 2 bundles	27.00 to	28.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	8.00 to	9.00
Cast iron borings	11.00 to	12.00
Low phos. 18 in. and under	72.00 to	73.00
Rails, random length	54.00 to	55.00
Rails, 2 ft. and under	74.00 to	75.00
No. 1 cupola cast	58.00 to	59.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	67.00 to	68.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	480.00 to	500.00
18-8 turnings	380.00 to	400.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	44.00 to	46.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	44.00 to	46.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 42.00 to	$ 44.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	13.00 to	15.00
Machine shop turn.	6.00 to	8.00
Cast iron borings	6.00 to	8.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	30.00 to	32.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 dealer bundles	10.00 to	12.00
Machine shop turn.	6.00 to	8.00
Shoveling turnings	10.00 to	12.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under (foundry)	86.00 to	88.00
No. 1 cupola cast	88.00 to	90.00

Seattle

No. 1 hvy. melting	$ 59.00 to	$ 61.00
No. 2 hvy. melting	48.00 to	50.00
No. 2 bundles	38.00 to	40.00
No. 1 cupola cast	94.00 to	96.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 55.00
No. 2 heavy melting cut 2 ft. and under	52.00
No. 1 dealer bundles	60.00
No. 2 bundles	30.00
Mixed steel scrap	34.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	25.00
Short steel turn.	28.00
Mixed bor. and turn.	15.00
Cast scrap	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	34.00 to	36.00
Machine shop turn.	19.00 to	20.00
Crushed turnings	35.00 to	37.00
Shredder scrap	67.00 to	68.00
Cut structural plate 2 ft. and under	84.00 to	86.00
Unstripped motor blocks	58.00 to	60.00
Cupola cast	71.00 to	73.00

METALWORKING ORDER TRENDS

Orders signals go from flashing yellow to steady green

The recovery in new orders for durable goods strengthened further in April.

Orders received by producers of durable goods climbed to $83 billion, up 3.8 pct from March. Further, April orders were up 7.2 pct over February.

In short, business is looking better.

And it is looking better for the big-tag lines in metalworking. New orders for nondefense capital goods in April were up $2.3 billion, or 11.7 pct, to $22.4 billion.

That jump in capital goods orders was the largest for any month since February 1979. This high-flying act was due largely to a big rush of orders for commercial aircraft.

Still, there was good breadth in the April orders rise for metalworking products. A glance down the numbers listed on the table here shows more plusses than minuses.

In commenting on the April orders rise, Commerce Undersecretary Robert G. Dederick noted, "It adds one more strand to the string of favorable economic activities for April and is still another indication that the business expansion is gaining momentum."

Notably, April data gives further evidence that durable goods inventories may now have reached a stabilization point. April saw a break in a 13-month straight fall in stocks. The gain was a relatively small one—up $500 million to $169.9 billion. Still, it seems to signal a turn in the inventory tides.

Inventories, of course, have to hit a bottom before orders can start up for real—and for long. That bottom may be near, or at hand. A good showing for stocks in May would go a long way in confirming evidence of a turning point for inventories.

One force that has been starting to give an upward push to metalworking new orders is rising activity in the defense sector. In April, for example, overall orders for electrical machinery were up almost 6 pct from March. This gain resulted mostly from a 10 pct rise in orders for defense-related communications equipment.

At this point in time, it is easy to read too much in monthly gains in new orders. But it is also a time when it is hard to ignore an increasingly strong upbeat trend in orders.

Right now, the orders advance is building a widening base. In month-to-month data, plusses are becoming the common sign. This is also true in orders for big ticket products.

Source: U.S. Dept. of Commerce Billions of dollars, seasonally adjusted monthly total, unless otherwise noted		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
Capital Expenditures (Annual Rates)				
U.S. Industry, Total	2nd Qtr.	$302.2*	$302.3	$323.2
Manufacturing, Total	2nd Qtr.	111.3*	112.8	123.8
Manufacturing, Durable Goods	2nd Qtr.	50.9*	52.8	59.0
Mining Industry	2nd Qtr.	14.6*	14.6	16.6
Key Indicators, Durable Goods Manufacturing				
New Orders	April	83.0	80.0	75.7
Shipments	April	80.4	79.6	79.5
Inventories	April	169.9	169.4	184.9
Unfilled Orders	April	299.0	296.4	301.2
New Orders, Metalworking				
Capital Goods Producers, Nondefense Industries	April	22.4	20.0	20.3
Capital Goods Producers, Defense Industries	April	7.0	6.6	4.8
Primary Metals, Total	April	8.9	9.2	8.5
Steel (SIC 331)	April	3.5	3.8	3.9
Iron & Steel Castings (SIC 332)	April	1.0	0.8	0.9
Nonferrous Metals	April	4.4	4.6	3.7
Nonelectrical Mach.-Equip. Industries, Total	April	14.8	14.3	14.4
Engines & Turbines	April	0.9	0.8	1.3
Farm Machinery & Equipment (Shipments)	April	0.9	0.9	1.1
Construction, Mining & Materials Hdlg. Equip.	April	2.1	2.0	2.3
General Industrial Machinery	April	1.1	1.1	1.3
Fluid Power Equipment** (Index-1972=100)	April	208	217	205
Metalworking Machinery	April	0.6	0.5	0.6
Machine Tools, Total (Millions $, unadjusted)***	April	119.2	125.5	150.8
Machine Tools, Metal-Cutting***	April	79.9	89.7	115.1
Machine Tools, Metal-Forming***	April	39.3	35.8	35.7
Electrical Mach. & Equip. Industries, Total	April	13.2	12.5	11.9
Elec. Transmission Equip. & Industrial Apparatus	April	1.8	1.7	1.7
Household Appliances	April	1.2	1.2	1.1
Communication Equipment	April	4.4	4.0	3.4
Transportation Equip. Industrial, Total	April	20.0	18.0	16.0
Motor Vehicles & Parts (Shipments)	April	11.3	11.0	10.1
Aircraft, Missiles & Parts	April	6.9	5.9	4.9
Shipbuilding & Military Tanks	April	0.8	0.3	0.7
Fabricated Metal Products, Total	April	9.5	9.7	9.4
Instruments, Total	April	4.1	3.9	3.9

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA.

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JUNE 24, 1983

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BRIDGING THE ISLANDS OF GRAPHICS AUTOMATION

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WHAT'S SO TOUGH ABOUT PUBLIC SPEAKING?

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LETTERS

compete on equal terms in quality, in price, and in service.

The answer lies in exactly what's going on in the automobile and steel industries at this very moment. Unions are negotiating wage concessions in order to allow manufactures of American goods to get their wage costs in line so they can compete in our own domestic markets. Once we start competing in our own domestic markets, we'll be on the road back to the time when "the U.S. was riding high and dominating world trade."—Henry W. Brandt, Ravenswood Works, Kaiser Aluminum & Chemical Corp., Ravenswood, W. Va.

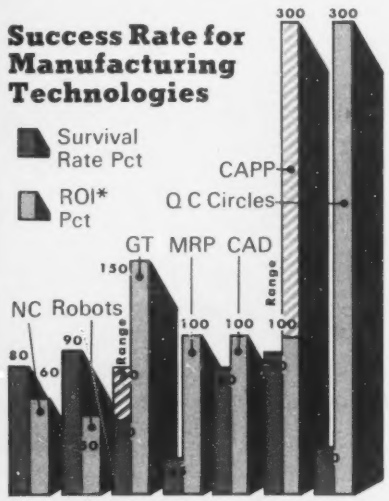
Basic industries

Your "Basic industries" editorials seem to be so on target, "Why we need basic industries more than ever," (*IA*, Apr. 13, '83, p. 7) and "Why high technology needs basic industries" (Apr. 22, '83, p. 7).

It's scary to think that those with authority, in industry and in government, are acting or reacting or not acting for some reason other than that which is good for *all* concerned.—Walter Hutt, president, Communigraphics Inc., Woodbury, N.Y.

Correction

In the article "Group Technology: revitalized by computer power," (*IA*, May 20, 1983) the chart that appeared on p. 70 is in error. The colors indicating 'survival rate pct' and 'ROI pct' were reversed. A corrected chart is shown below.



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FARM MACHINERY STILL HAS A LONG ROW TO HOE

With forecasts calling for a gradual sales gain, farm machinery makers should have few problems meeting the market's demands.

BY KEITH W. BENNETT

A fast recovery in 1978, when farm machine companies were still laying off workers in the first calendar quarter of that year, brought dealer shortages of farm machines by May and June. The subsequent boom carried farm equipment sales upward for 18 months.

Since then farm machine companies have been laying off workers, closing plants, and selling off manufacturing equipment and product lines as they struggle to survive.

Two of the biggest farm machine builders have halved their plant total. There have been other capacity losses among smaller producers. But much of the loss is in fabricating and open assembly space. It can be boosted quickly in a recovery by leasing outside plant space.

In the 1973 recovery, a 25 pct sales gain exhausted farm equipment inventories in about three months. In 1978, a 30 pct sales recovery cleaned out stocks in about the same length of time.

In its main plants, the farm equipment industry has hung on. Its machining capacity is strong and has been since 1979. Deere is most frequently mentioned, but all farm machine producers had good capital programs in 1979 and 1980. Some new equipment was still coming on in 1981. As one manufacturing official at International Harvester pointed out, eight DNC machine tools in one line replaced 77 older machine tools and with higher output.

Some capacity has been soaked up by new products. Light industrial equipment comes from many of the same plants, and this has improved with the housing market. Some short liner capacity has been reduced as they took on work farmed out from the bigger farm machine companies. In one past downturn big companies farmed out so much work to short liners that some short liners grew in size through the slump.

The farm machine plants, considering their problems, have held their plant capacity surprisingly well. The in-

Farm Equipment—Waiting for the Recovery to Sprout

	Farm, Gross Income, Billions of Dollars	Retail Tractor Sales, Units	Employment in Farm Equipment Plants	Sales, Billions of Dollars
1983	145.0*	84,000*	97,600*	13.0*
1982	142.0*	77,000	93,000**	12.2
1981	143.0*	103,000	135,300	15.8
1980	137.7	119,331	147,400	15.1
1979	133.2	138,990	158,900	15.9
1978	115.9	139,607	145,100	11.9
1977	98.1	130,912	149,500	11.9
1976	95.1	153,189	162,100	10.5
1975	89.0	161,145	160,800	9.9
1974	92.9	173,799	169,200	8.6
1973	89.6	196,994	153,600	6.9
1972	65.0	156,762	135,000	6.9
1971	56.0	131,523	n/a	5.5

*Estimates
**Year-end figure, not annual average

dustry's current production capacity is more productive now than it was in the 1979 boom. If farm equipment gets the gradual gains it has forecast for 1983, it'll have no problem and plenty of reserve capacity.

Unfortunately, the history of the farm equipment industry is full of sudden spurts. There never has been enough capacity and there isn't now. The plants, with castings a particular bottleneck, quickly overload and deliveries to the dealers get stretched out. And if the plants can't keep up with the demand, there are some brand new foreign tractor builders (Japan and Russia) who would jump at the opportunity to replace those dealer inventories.

At this point, the biggest builder (Deere & Co.—$4.7 billion in 1982 sales) has held intact. It has as much productive capacity now as it did at any time in its history. Nevertheless, it has cut back from $300 million in new investment in its farm machinery plants during 1980, to $130 million last year, and $100 million in fiscal 1983.

Its two biggest competitors, International Harvester Corp. and Massey-Ferguson Ltd., were in tougher cash positions and suffered considerably in the cutbacks. Massey-Ferguson closed its Des Moines, Iowa, plant in 1981. Since then, it has cut its three-plant complex at Detroit to a service group. It also reduced assembly space at its big plant in Brantford, Ont., but concentrated tools there to build heavy tractors and much of its production of combines.

It closed 15 plants. It still maintains worldwide operations in the United Kingdom (tractors and engines); France (tractors, combines and balers); West Germany (components, fluid power parts and combine transmissions); Italy (assembly and gears), and Australia (combines and special machines).

This leaves intact its key machining and casting facilities (two foundries in Canada). It added some equipment for producing new product lines in its engine plants and tractor plants. Like most producers, however, the bulk of capital seems to have gone to new model design and tooling. It reopened its combine line in January.

Massey-Ferguson believes it picked up a 1 pct market share gain in tractors and a 2 pct gain in combines. It also sold off a tractor plant in Brazil and a U.K. plant, and closed a foundry in West Germany, in addition to the shutdowns in Detroit. That leaves about 18 plants (not including engine plants) for the company, which had $2 billion sales in depressed 1982. Its capital input peaked early in 1976 at $175 million. It has been running about $45 million per year the past three years.

International Harvester came into its financial pinch later than Massey-Ferguson, but hit it as the market for farm machines was making its worst plunge. Of 14 farm machine plants, International Harvester has plans to close seven.

The core plants remaining are the tractor plant in Rock Island, Ill. (tractor and truck engines), plants in Hamilton, Ont. (implements). Overseas, it has plants in Germany, U.K. and France for equipment and tractor engines. Indianapolis is mainly a supplier to the truck group, but can feed castings and machined components to the farm equipment group. It is one of two foundry bases for International Harvester. Waukesha is a modernized nodular iron castings producer. All of these seem to be on the books for the future.

Ford Tractor plants are capable of handling an upswing merely by adding shifts.

International Harvester was expected to sell its Louisville, Ky., plant in July at a reported price of $26 million. This deal, however, has been cancelled.

This plant has been an important manufacturing base for International Harvester, since it includes a foundry, a forge shop and a major machining line (valued earlier at about $12 million) that made axles and transmissions. IH moved the machining line to its plant at Rock Island, adjacent to its Farmall tractor plant, which is scheduled to begin tractor production in August.

International Harvester's capital input peaked in 1980 then slipped to $108 million last year. Farm machinery sales are 43 pct of total sales. The capital input went into both truck and farm machinery plants, so farm equipment would only receive part of the outlays, but new equipment was still coming on stream through 1981.

Allis-Chalmers Mfg. Co. has closed its foundry in Milwaukee. This was rated at over 2,000 tons per month and was a modern foundry, rebuilt in the wave of farm equipment plant modernizations that followed the cash flow surge of 1978-79. It has been closed because of high labor costs.

Allis-Chalmers has four main plants. At West Allis, it builds tractors and has restarted production in this plant. It builds combines at Independence, Mo., engines at Harvey, Ill., and has said earlier it would sell an implement plant (discs and plows) in LaPorte, La. This hasn't been closed, but might be sold or closed by the end of 1983.

Ford Tractor Operations is a short-line producer of tractors, but farms out work in other implements including combines. This is a manufacturing resource that's still fully intact, with a tractor assembly plant at Romeo, Mich.; a transmission and axles tractor assembly facility in Antwerp, Belgium; an engine and hydraulics plant at Basildon, U.K.; and an assembly plant with engine production in Brazil. The Brazilian facility has its own foundry, though the castings output is consumed in the local market.

The Ford tractor plants are capable of handling an upswing merely by adding shifts to the plants.

J. I. Case, part of Tenneco, is an important tractor producer with five plants and two foundries and its main base of operations at Racine, Wisc. Case Vice President Robert Riebau points out that this capacity is also intact, ready for an upturn.

Case added a $6 million valve fabricating line at its Rock Island, Ill., plant. That line began production last November. This plant also produces four-cylinder engines. Other company sources note that, Case did a better job on inventory reductions than it had expected and that it has raised its sales targets for 1983.

Steiger Tractor, another short line tractor builder and a specialist in big, top-of-the-line machines, put in some new machine tools last year including a $500,000-plus Sundstrand machining center and a CNC lathe, to handle the new tractor designs.

White Farm Equipment, with three plants and its own 400 ton-per-day gray iron foundry, is a producer of combines. It also builds tractors as well as tillage and planting machines. Robert Fuller, chief operating officer of this group, says that it has weathered the storm and kept its machining and foundry capacity intact.

Beyond these companies is another capacity reserve of some 1,100 smaller producers, the "short liners," who produce a few different lines.

Their numbers were reduced by business failures, but surprisingly, the Farm Equipment Manufacturers Association finds the number of new members again rising.

People buy up companies that have either failed or been spun off. So, that capacity is holding better than expected. By March, a number of these plants were making slight increases in their production schedules. □

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IGES: BRIDGING THE ISLANDS OF GRAPHIC FORMATION

IGES extends the potential of CAD/CAM systems, building blocks of the automated factory, by letting them talk with other systems.

BY ROBERT E. HARVEY

Hotel rooms set aside for the conference had filled up weeks in advance. And as the two-day meeting got underway, speakers looked out on a standing-room only crowd.

"Heck, who ever thought 300 people would turn up at a conference about something no one even knows how to pronounce," marvelled one attendee. "So far I have heard 'I guess,' 'I jest,' 'I gees,' and 'eye juice' and I've only been here ten minutes."

At recent seminars and conferences (like the one mentioned above sponsored by Management Roundtable Inc., Chestnut Hill, Mass., last month in Washington, D.C.) industry officials having been taking a crash course in IGES (Initial Graphics Exchange Specification).

High interest in IGES is the direct result of the explosion of CAD/CAM (Computer-Aided Design/Computer-Aided Manufacturing) systems. Some 10,000 have been sold in recent years. These systems have done much to improve design and manufacturing productivity. But as the number of systems grew, users began experiencing the notorious Tower of Babel Syndrome. This syndrome can be summed up by the axiom: The greater the proliferation of CAD/CAM systems, the harder it becomes to get them to talk among themselves.

To unshackle the potential of CAD/CAM and make it more than simply an island of automation, its data has to be made portable, portable across different hardware and portable across different software packages. IGES was developed to address this need.

Translating data from one system to another was going on well before the appearance of IGES. Custom translators have been developed which let incompatible systems talk to each other. However, constructing all the translators needed to link all the systems that want to be on speaking terms with each other can be a monumental task, for these specialized exchange programs only know about the two CAD/CAM systems for which they were written. Any change in a vendor's systems means changing the translator.

IGES was developed to reduce communications problems between systems. Its creators reasoned that if a standard format, a common language independent of all CAD/CAM systems, could be formulated, translations could be simplified.

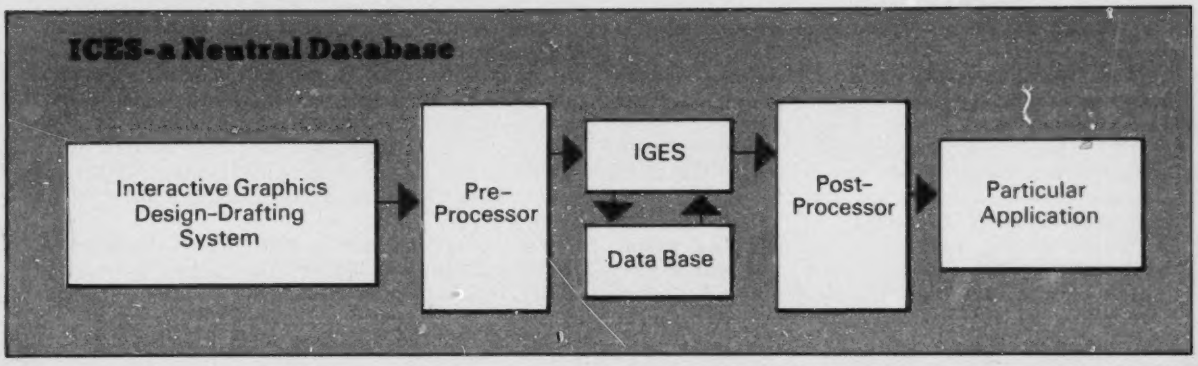
Only one translator, a pre-processor, would be needed to translate data from any one system into standard data. And only another translator, a post-processor, would be needed to convert the standard data back into the language of a particular system. With a common second language available in addition to system's own propriatory language, islands of automation will become more accessible.

"Different islands of automation are addressed by different vendors," explains Joel N. Orr of Orr Associates, a consultant in Danbury, Conn. "Also they are addressed by different parts of your manufacturing organization. Many of these islands depend on getting data in a certain format and unless we have a broad-based, a broad-band format through which we can pass the data from one part of the process to another, we are not going to be able to implement the automated factory."

A company can go out and buy a robot, an NC machine, a network, a system or any other piece of equipment, but its factory will continue to limp along until these systems are linked together properly.

"You are going to have to establish a common language among all these different parts," says Dr. Orr. "I would like to suggest that the current IGES effort is heading us in this direction."

Recognizing that the full potential of CAD/CAM was being stymied by difficulties in communicating between different systems, representatives from



government and industry got together in 1979 to initiate a program to overcome this obstacle. Initial funding for the project came from NASA and the Armed Services through the Air Force's Integrated Computer-Aided Manufacturing (ICAM) program and was used primarily by a group of CAD/CAM suppliers and industrial users.

Early work on developing a data exchange standard was done by the National Bureau of Standards (NBS), the General Electric Co., and the Boeing Co., with the NBS coordinating the overall effort. The American National Standards Institute recognized IGES in 1980 and included it as part of a proposed standard for the digital representation for communication of product definition data. Approval of the standard was issued in September 1981.

"The IGES program has focused the efforts of 52 (now 56) companies on the development and documentation of a means of graphic database exchange among present day CAD/CAM systems," says Bradford M. Smith, head of the Manufacturing Systems Group, Automated Production Technology Div., NBS.

As companies become increasingly automated, many firms find themselves with a large number of design systems, often from a variety of manufacturers. And each CAD manufacturer has its own way of storing geometric models and related information. Firms, especially those with a large number of incompatible automated design systems, have begun to look to the neutral format of IGES as a way of moving that design geometry beyond a particular CAD system.

"You have to integrate these systems into a corporate network," says Mr. Smith. "You have to be able to talk to your subcontractor, to your customers. IGES allows you to do this by providing a public interface between your system and any foreign process, as we call it. That foreign process could be a design routine for a family of parts, an analysis routine for a product; it could be special purpose software that you have developed. It could be another turnkey system or your manufacturing process. The types of foreign processes are almost limitless."

The reason that many companies own a lot of non-communicative systems, according to a report by Alan M. Christman, general manager, manufacturing industry marketing, Control Data Corp., Bloomington, Minn., is because, "systems implementations are generally single function or departmental level solutions. In theory, the application possibilities of the systems are numerous. In reality, we see single turnkey systems acquired specifically for a single function. For example, 80 pct of CAD systems are simply used for drafting."

Mr. Christman explains that this preoccupation with purchasing for a single function has resulted in a proliferation of data bases and systems, "all of them from different vendors and often not accessible to users of other systems. The result is an expensive, time-wasting, less efficient effort that erodes the very productivity that the system promotes," he says.

Firms that Are, or Plan to Be, Compatible with IGES

Company	Offers IGES Compatibility	Plans to Offer It	Processors Already Delivered
Applicon	■		2
Auto-trol		■	
Bausch & Lomb	■		
AM Bruning		■	
CADAM		■	
CADLINC	■		
Calcomp		■	
Calma	■		12
CAMAX		■	
CASCADE		■	
Compeda		■	
Computervision	■		50-100
Control Data	■		40
Data Technology		■	
Decision Graphics	■		
Engineering Systems		■	
Gerber Systems	■		8
GRAFCON	■		
Graphics Technology	■		
Holguin Assoc.		■	
Honeywell	■		
Information Displays	■		
IBM	■		
Interactive Systems	■		
Intergraph	■		25
Keuffel & Esser		■	
MAGI		■	
Manu. & Consult. Svcs	■		120
Marc Software	■		
MATRA DATAVISION	■		1
Mcauto Unigraphics	■		
Mentor Graphics		■	
Prime	■		
Project Software		■	
Racal-Redec		■	
Summagraphics		■	
Telesis		■	
Systemhouse		■	
T & W Systems		■	
Tektronix		■	
Vector Automation		■	

Source: Machover Association Corp. and NBS

A number of companies, if they could standardize their equipment around a single vendor, would not have to concern themselves with IGES. For other firms, however, relying solely on one vendor and not considering IGES would be a big mistake.

For one thing, no turnkey CAD/CAM can meet all automation needs for everyone. For another, by going with only one vendor, a company has reduced its options and flexiblity.

"Any company that thinks that it can say by decree that it will buy only product A for a graphic system is really not understanding the problem," says Mr. Smith, "because as soon as you standardize on a product, someone will come along with a far better product and you are going to find yourself rapidly becoming obsolete. Ideally, what you would like to do is develop an integration philosophy that will allow your firm to use the best available technology and, when that becomes obsolete in six months or six years, lift the out-of-date module out of the system and plop into that space a new module that will fill that function much better.

"This exchange cannot be done unless a firm has some kind of exchange standard. Without this standard the expense of the software engineering needed to replace the system would probably make updating far too expensive to consider."

Besides extending a company's flexibility and its ability to integrate operations, IGES holds the promise of solving the problem of long-term data storage or archiving.

"Archival data is data which you traditionally have been storing on engineering drawings in a vault. This is the life blood of many of your companies," suggests Mr. Smith, "and in many cases it is required by law to maintain the record of the design and manufacture of certain component parts for as long as the product is useful. If the record exists on computer-readable format, it would certainly be to your advantage that it be kept in its computer-readable format for that lifetime."

If computer systems are changed or upgraded, there is danger that old data would become difficult to retrieve. With IGES, however, old graphics could be converted into the neutral IGES format and then picked up by whatever system needs the information.

While IGES has a number of potential benefits, it is not the panacea that some people take it for. Because IGES is new and still relatively unknown, a number of myths have grown up about its abilities. IGES is not a cure-all, it is but a first step towards graphics integration.

According to Dr. Orr, one myth is that management thinks that with IGES, "the electrical guys can get the CAD system they want, and the mechanical guys can get their system, and facilities people can get their system, and, in the end, they all will be able to talk to each other."

Another myth goes something like this: "Now we won't have to worry about communicating with vendors or suppliers, because no matter what system they have, we can work it out through IGES."

Dr. Orr's third myth: "We can archive our interactive computer graphics

files and know that any time in the future we will be able to read them into whatever format we are using."

"The truth is that a joke in French, if translated from that language into another language and from that language into German will seldom make Germans laugh at the punch line. Now this has nothing to do with the intermediate language, but it has to do with the differences between French and German. There are things you can say in French that you can't say in German and vice-versa. There are things you can say in Calma that you can't say in Computervision. The best thing IGES or any other standard can do is be transparent, it cannot improve on the data that is going through."

"My message to users is to do careful evaluation before using IGES," comments Ralph J. Mayer, manager, database management, Computervision Corp., Bedford, Mass. "Do not accept statements like 'we support IGES' or even 'we support the following IGES entities'. There are always exceptions and limitations."

Despite extensive documentation by vendors such as Computervision as to what IGES entities they support and translate, "I would not want to guarantee a successful translation between Computervision and another vendor," reports Mr. Mayer.

If a translation is not working properly, "the fault lies with the users who are simply taking a very complex tool and saying, 'I'll plug it in and I expect productivity to come out the other way,' " says Dr. Orr.

IGES, although not yet in widespread use, is gaining in popularity. Several hundred companies are working with IGES, however, only a few of these firms are using it in a production environment. Much work still must be done on improving the translators.

Many CAD/CAM vendors are committed to translator development. In addition, a number of firms that have developed their own in-house CAD/CAM software packages, are writing translators. These firms include General Motors, Ford, General Electric, Bendix, Boeing, Deere, Lockheed, Martin Marietta, SDRC, and Westinghouse.

As IGES grows, it evolves. Feedback from the first version has gone into developing IGES Version 2.0, which is a refinement and extension of Version 1.0. The most notable advancements of the newer version over Version 1.0 are the addition of finite element modeling data and electronics printed wiring board product data. Previously there was no method of handling data from these areas.

Version 2.0 also contains details for an optional or alternate binary format representation which increases processing speed and reduces file size. Unwieldy file size and slow speeds were two complaints about Version 1.0.

Simply stated, IGES is a data format used to represent the geometric and non-geometric information that is stored in CAD/CAM systems, arranged in a particular file structure.

But IGES is not the only language that has been developed to act as an interface between dissimilar systems. Intergraph Corp., for one, has constructed its Standard Interchange Format (SIF) which, like IGES, is a language for the exchange of graphics and non-graphic information.

According to Patricia Brown, ISIF manager, Intergraph Corp., SIF has several advantages over IGES. "It is not a fixed format structure, but is free-form, using keywords to identify specific data and parameters. Its syntax is generic and applicable to graphic systems in general, and its sequential file structure, combined with its keyword capability, eliminates the need for pointers and is consequently a more direct and coherent presentation of data."

By using active parameters rather than passive ones, Ms. Brown claims that SIF files are smaller than their IGES counterparts.

Vought Corp., with its Standard Product Data Exchange File format (SDF) is another firm that has developed a standard file format which it finds superior to IGES.

Despite any advantages that formats such as SIF and SDF may have, IGES probably will become the industry standard. "The momentum for IGES right now is just too strong," says one conference participant. "Plus, IGES has been a group effort rather than the work of just one firm."

IGES is being challenged not only by developers of other standards, but also by companies that offer expertise in the direct conversion of information from one data base to another. Direct conversion eliminates the need of a neutral format.

John Greene of Octal Inc., Mountain View, Calif., argues that "IGES and other intermediate schemes are premature, that IGES cannot be all things to all people, and that viable alternatives exist."

According to Mr. Greene, IGES is only a recent development and has several drawbacks which make direct database conversion preferable in many cases.

"Direct database translation has many advantages over an intermediate format. These include: lower development cost, more accurate and complete data translation, no cumbersome intermediate files, faster conversion runtime and single-source software."

Mr. Greene compares IGES to Esperanto which was supposed to be a neutral universal language for mankind. Esperanto faded into oblivion as an impractical anachronism. He believes that if IGES "is not to become the Esperanto of the computer world, some narrowing down of its scope must take place."

In the past, computers were able to talk to each other after programmers developed expensive, time-consuming, custom-written, in-house computer programs. Today, other options such as direct conversion and conversion through a neutral format like IGES are available. IGES is still in its infancy, but holds the promise of being a major step forward in one of industry's biggest challenges: linking the islands of factory automation. □

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AUTO ENERGY: MEETING THE NEED IN THE FUTURE

Methanol holds tremendous promise and it's made from U.S. coal.

Shifts in fuel prices always hit automakers hard. By 2000 they'll likely need new engines to use different fuels. In part two of a two-part series, Iron Age *examines: Can American auto and oil companies and government reduce U.S. dependence on imported oil?*

BY BRYAN H. BERRY

Five years from today, all new cars built in the U.S. could use methanol made from U.S. coal. All that's required is for the U.S. government, auto industry, and energy industry to agree to do it.

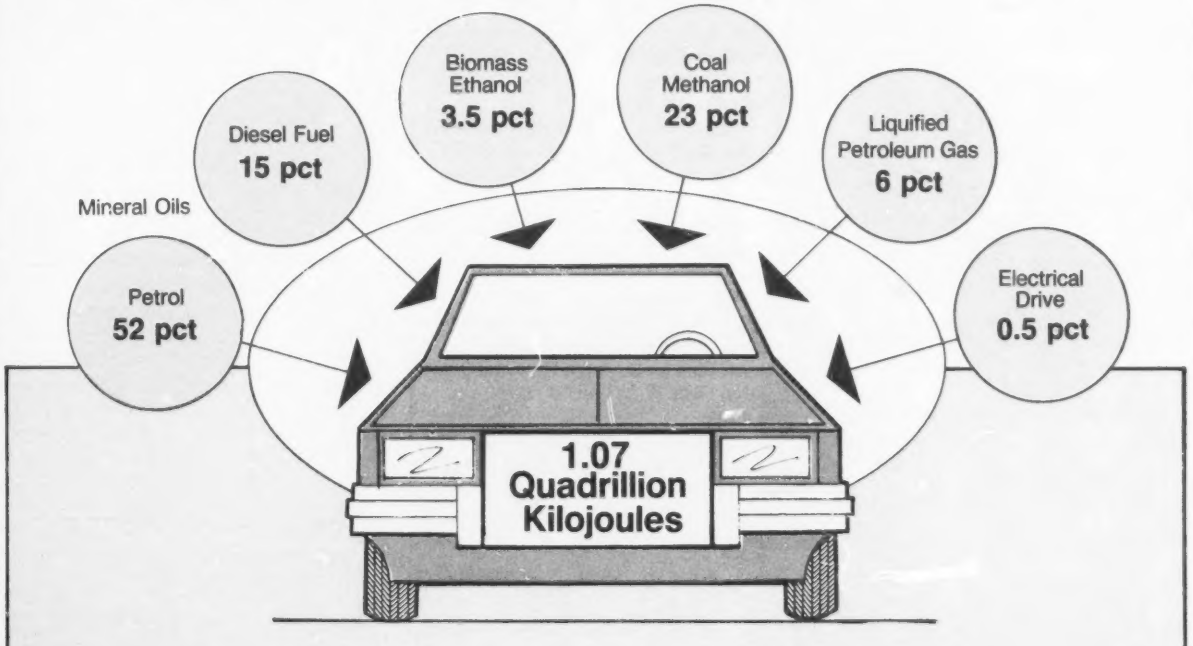
Already General Motors and Ford are working with major oil companies. Ford has projects with Sohio, Conoco, and Amoco. GM and Gulf of Canada recently completed a joint study of how to process diesel fuel from Canadian tar sands.

Can giants like the U.S. government, Exxon, and General Motors cooperate to free U.S. cars from dependence on foreign oil? Could U.S. metal producers supply the materials to build huge methanol plants? Could U.S. metalworking companies supply the parts needed in methanol-powered engines?

"The most difficult and intriguing question of all," says Dr. E. E. David, Jr., president, Exxon Research and Engineering Co., "is how to make the transition to methanol-powered cars. It looks like one of those insoluble chicken-and-egg problems.

"How can the auto manufacturer risk mass-producing methanol engines unless the fuel companies stand ready to market methanol? And how can a fuel manufacturer produce methanol unless the auto companies stand ready to produce the cars? Remember that one 50,000-barrel-per-day methanol plant would require a two-million-car market

Possible Sources of Energy for Vehicles in Year 2000



Source: Volkswagen R&D.
These projections are for West Germany.

to absorb its output."

The United States has 20 times more energy stored in coal than the Middle East has in oil. Estimated U.S. coal reserves are equivalent to 11,751 billion barrels of oil.

"In principle," says Glenn R. Brown, senior vice president, technology and planning, Standard Oil of Ohio (Sohio), "enough methanol or synthetic gasoline could be made from U.S. coal to power every car in the country. U.S. coal reserves are vast and plant siting options diverse. Coal-based synthetic fuel plants could be scattered widely through the country."

The U.S. also has twice as much energy stored in shale oil as the Middle East has in oil. Estimated U.S. shale-oil reserves are equivalent to 1,935 billion barrels of oil.

The gasoline refined from shale oil can be used in today's cars. This fall Union Oil will begin producing 10,000 b/d of shale oil for the U.S. Air Force.

Short-term, some automakers favor development of shale oil. They wouldn't have to change their engines.

Long term, however, methanol may be more appropriate for ground transportation, says Dr. Herbert Lander, technical area manager, aviation fuel development, U.S. Air Force.

Gasoline or jet fuel refined from crude or shale oil has an energy density twice that of methanol: You can go twice as far on one gallon of gasoline as on one gallon of methanol. Military aircraft, says Dr. Lander, would be the most likely users of shale oil; then they wouldn't have to stop to refuel so much.

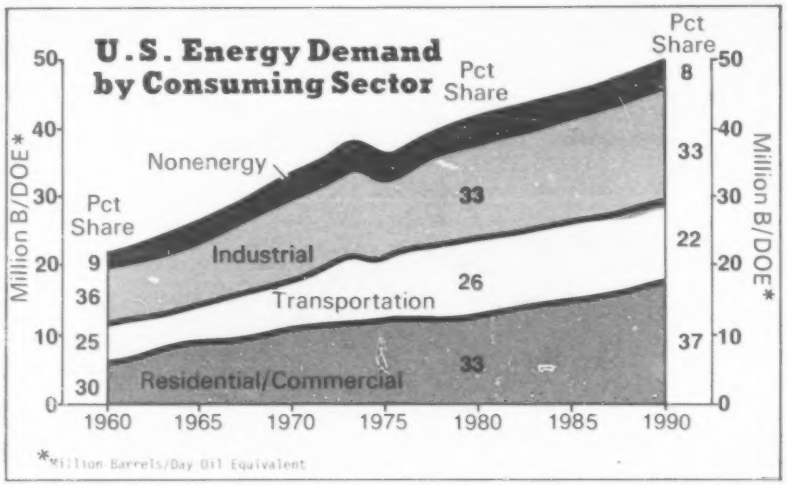
"On the ground, however," says Dr. Lander, "you can have larger fuel tanks than in aircraft. There are many fuel stations in most parts of the country, so range isn't so critical. Guarantee a range of 300 to 400 miles, and civilian or military ground vehicles can use methanol.

"Methanol is the best illustration of the need for partnership between chemical and automotive engineering," says Mr. David of Exxon. "With an octane rating of 110, methanol might allow jacked-up compression ratios that, in a lean-burn engine, could bring efficiencies a third higher than conventional gasoline engines—and with fewer emission problems.

"Moreover, in a direct-injection, stratified-charge (DISC) engine, engineers might be able to boost this efficiency by at least another third."

Ford, Volkswagen, Daimler-Benz, and MAN of Germany are working on methanol DISC engines.

Disassociation of methanol into hydrogen and carbon monoxide also could boost the fuel's efficiency by 15 to 20



pct. Ford and Conoco engineers are developing a catalytic chamber that will use exhaust heat from the engine to disassociate methanol coming from the fuel tank. The hydrogen and carbon monoxide then would be fed into the engine.

"We don't think it's possible to have a catalyst large enough," says Thomas J. Feaheny, vice president, vehicle research, Ford Motor Co., "to run the vehicle this way all the time. When you accelerate hard, you'd probably use liquid methanol.

"But for lightly loaded cruising, you might be able to use these hydrogen and carbon monoxide gases and improve fuel economy.

"In the next two to three years we'll find out how feasible this is."

"We're pretty excited about this," says M. L. Sharrah, senior vice president, research and engineering, Conoco, Inc. General Motors and Volkswagen are considering similar research with Conoco.

So far, no automaker has produced an engine that makes full use of methanol's high efficiency. The oil industry, on the other hand, has not determined what the standard composition of methanol should be, says Mr. Feaheny.

Should the engine use nearly pure methanol, or should it use a blend? Experts disagree.

"Pure methanol is not a sensible fuel," says Mr. Feaheny. "You need additives for lubrication; and for cold-start. You need additives to give methanol color and odor.

"In its chemically pure state, methanol is colorless and virtually odorless, with a slightly sweet smell. If you washed with it, your hands would feel very clean. But methanol is poisonous and can cause blindness."

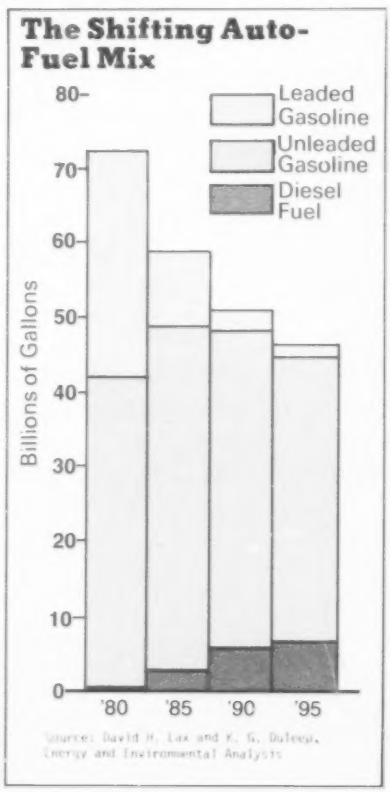
Cold start is methanol's top problem.

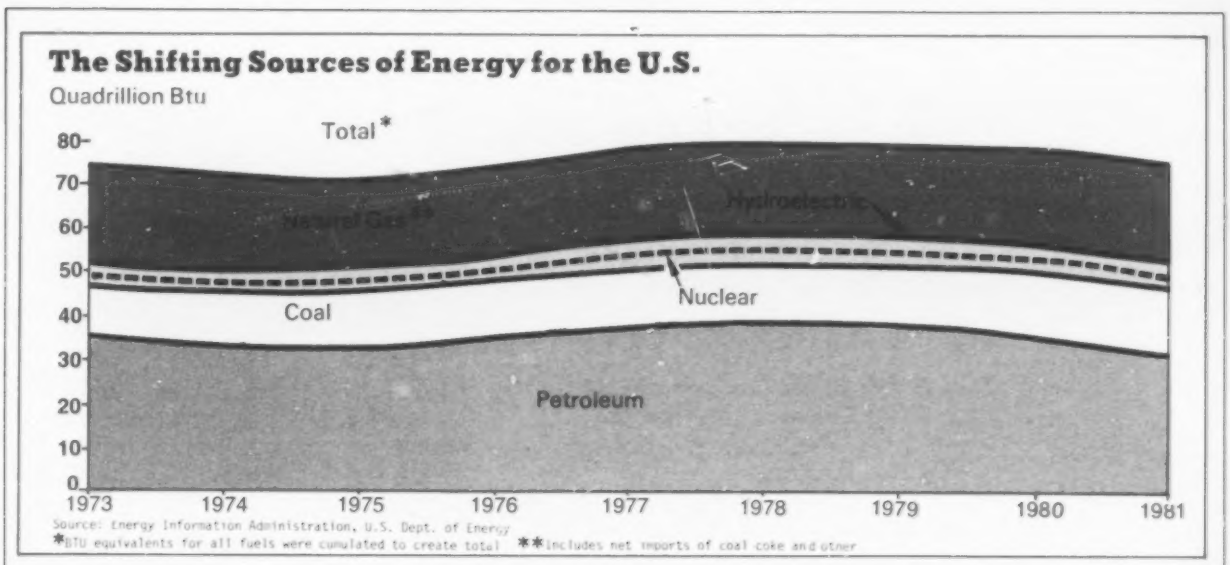
"An engine powered by methanol," says Nick E. Gallopoulos, General Motors Technical Center, "won't start at less than about 55°F. Methanol doesn't vaporize very readily. It's an engineering problem: You don't necessarily need new technology."

Among the solutions being studied by automakers, says Mr. Gallopoulos:

"1. You could have a small tank of gasoline or propane (liquefied natural gas) and a little squirter pump that will give you enough gasoline or propane to start the vehicle. Then you switch from that starting fluid to the methanol. In Brazil that's how they start their ethanol (grain alcohol) cars: Gasoline is the starting fluid.

(Cont. on p. 46)





(Cont. from p. 43)

"2. You use some kind of heater, perhaps electric, to vaporize the methanol.

"3. You blend some volatile material, probably a hydrocarbon, with the methanol, so you have a mixed fuel in the fuel tank. This enables you to start at lower temperatures. Of all the blends tried so far, however, none has been able to start in a Michigan winter.

"4. You use a heater plus the blend of the methanol with something more volatile."

Most fuel companies want to avoid blends that use a significant percentage of fuel besides methanol. They'd like to use just the miniscule amount of additives used in today's gasoline.

"The worst possible thing you could do," says Mr. Sharrah of Conoco, "is burn a fuel that had just 15 or 20 pct methanol, as some suggest. To do that, we'd have to convert our fuel system to produce enough methanol; and yet the car engines wouldn't get all the advantages of methanol's compression ratio.

"On the other hand, if you burned just 2 or 3 pct methanol, you could leave the engine as is. We should use either 2 or 3 pct methanol or nearly 100 pct methanol, not a blend of 15 pct methanol."

Officials of Los Angeles County and the California Energy Commission already are using a fleet of methanol Ford Escorts. The U.S. could phase in alternative fuels by introducing them first to fleets and selected regions of the country, most likely the West Coast.

Unlike gasoline, methanol has to be stored in tanks that never store other fuels. Methanol and other alcohol-based fuels absorb water, so they have to be kept completely dry.

The parts of the car that directly contact the methanol probably won't be made of uncoated steel.

"Methanol is a unique solvent that's corrosive," says Mr. Feaheny of Ford, "and dissolves some substances. It likes to dissolve rubber and polymers, fuel-tank linings, and trim plate. It attacks basically all metals: steel, zinc, and aluminum.

"The ultimate solution would be to use more plastic materials like nylon or polyethylene that are impervious to attack from methanol; or use more coatings of metal parts. A plastic fuel tank would be possible.

"Also, we are trying different metals: stainless steel in the fuel tanks and tubes; and nickel plating for the carburetors."

"People simply haven't concentrated on what alloys should be used," says Mr. Brown of Sohio, "for different engine components, for gaskets, and for throttle valves and plates.

"The methanol engine is really no different from a gasoline engine. It's not hard to make the conversion. Most car companies could produce a methanol-engine car within one year if they devoted their attention to it."

Fuel companies could build large-scale methanol plants within three to ten years, depending on how strictly the government enforced environmental regulations.

Crucial to the ability of the United States to build methanol plants quickly, says Mr. Gallopoulos, is "our capacity to produce the right kinds of steel and the right kinds of reaction vessels."

Both shale-oil and methanol plants would require huge, thick-walled vessels. That would mean big orders for steel, construction, and off-road-vehicle companies.

Other alternative fuels are compressed natural gas (CNG); liquefied natural gas (propane); and ethanol (grain alcohol).

"Natural gas," says Mr. Feaheny, "is free of the problems that alcohols have with corroding, being toxic, and attacking various seals and rubber polymer components of the car.

"The big issue with natural gas is high-volume production of pressure tanks to store the natural gas at 2500 to 3000 psi maximum. Probably these tanks will be aluminum cylinders wound with composite fiberglass or Kevlar or some other reinforcing composite material to build in hoop strength around the cylinder's diameter. Steel is much too heavy."

Experts disagree about how much natural gas the U.S. has. Deregulation of natural gas probably will eliminate any price advantage natural gas has over gasoline.

"Natural gas," says Ralph D. Fleming, office of vehicle and engine r&d, Dept. of Energy, "logically can be used in home heating, stationary industrial applications, and some vehicle fleets, but not as a total transportation fuel."

One appeal of both compressed natural gas and electric vehicles: You can fuel your car at home. Using a small compressor, a car owner can pump CNG into his car for four hours and get a 200-mile range.

Electric vehicles still lack a powerful battery. GM is working on a zinc/nickel battery.

Ford already is selling cars and trucks powered by propane. GM has no similar plans.

"Propane," says Mr. Feaheny, "is a by-product from the production of crude oil and natural gas. It will never play a major role; there's not enough available."

Ethanol, on the other hand, already is powering many cars in South America: 60 pct of the cars currently produced in Brazil use pure ethanol.

BEST AVAILABLE COPY

Ethanol is made from different plants, or biomass. In Brazil, ethanol is made from sugar cane. In the U.S., ethanol made from corn is subsidized but not commercially competitive.

"If we could make ethanol cheaply," says Mr. Gallopoulos of GM, "from such low-value plants as corn stalks or scrawny trees, ethanol might be competitive in the U. S. Genetic engineers are researching that.

"In some parts of the world a cheaper biomass is available. Ethanol has a good future there but not in the U.S."

Besides Brazil, South Africa and New Zealand have active programs to develop alternative fuels. New Zealand imports 100 pct of its energy but has large local deposits of natural gas. Now the country is pursuing projects both to compress the natural gas and to convert it to methanol or gasoline. South Africa soon will begin operating its full-scale Westinghouse coal gasifier.

Mexico, Argentina, Germany, Sweden, Thailand, and Japan are actively studying alternative fuels. Saudi Arabia and Japan recently agreed to market 660,000 tons of methanol in Japan and elsewhere. Japan imports almost all its energy.

Brazil uses more alternative fuels than perhaps any other nation in the world. Should the U.S. government mandate the same sort of stiff energy requirements imposed by the Brazilian government? How can auto companies, fuel companies, and the government cooperate to increase the use of shale oil and methanol in the U.S.?

The public and private sectors did cooperate to phase in unleaded gasoline and diesel fuel. Government regulations drove unleaded fuel, reduced emissions, and increased fuel economy.

The approach might work again. The U.S. government could require fuel and auto companies to sell a certain percentage of methanol or shale-oil fuel and cars each year. Or it could give incentives such as tax relief for research and development and sales of alternative fuels across the board.

"I'd like to see the government guarantee the price of imported crude oil," says Mr. Feaheny. "As OPEC lowers its price, the government would raise the tax so that the price of oil would be kept constant. That way someone investing in alternative energy would know what price he'd be competing with when he delivered his product to the market.

If automakers knew the future price of gasoline, they would be able to build the right mix of big and small cars to meet market demand. Chrysler Chairman Lee A. Iacocca is proposing a 25¢/gallon tax on today's gasoline.

"We've got to get serious again about an energy policy," says Mr. Iacocca. "Slap a surtax on imported oil or an excise tax on gasoline at the pump, and send a message to the American consumer that the days of conservation are not over, big cars are not back to stay, and gas is not there to be guzzled again."

"Customers will not want efficient autos or synthetic fuels at any cost," says Mr. David of Exxon. "Auto and fuel companies will be competing hard for their dollars, with price a dominant concern."

"The private sector and the free marketplace," says Mr. Fleming of DOE, "have to determine which alternative fuels are best. The government shouldn't arbitrarily dictate to industry which quantities of which fuels are best.

"But there's one problem with leaving energy to the marketplace, history shows: You have to have another shortage before people get going on what needs to be done." □

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EFFECTIVE JUNE 13, 1983

MATERIALS NEWSFRONT

Important Notice About Iron Age Scrap Prices

Beginning with the Jan. 21 issue Iron Age has been publishing only one set of scrap prices per issue—those with the effective date as close to the issue date as printing schedules permit. Prices for other weeks are available on a weekly basis through our Metal Price Phone Hotline or through our Weekly Price Newsletter.

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective June 13, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,621	1,631	35,638	37,560
Capability Utilization Rate	56.1	56.4	53.2	55.0

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.297
Pig Iron** (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	$ 70.83	$ 70.83	$ 67.50	$ 61.83
No. 2 bundles	$ 46.50	$ 46.50	$ 46.50	$ 44.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 72.50	$ 72.50	68.50	$ 64.50
No. 1 steel, Philadelphia	68.50	68.50	66.50	64.50
No. 1 steel, Chicago	71.50	71.50	67.50	56.50
No. 1 bundles, Detroit	71.50	71.50	69.50	52.50
Low Phos., Youngstown	75.50	75.50	71.50	68.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	103.50
No. 1 mach'y cast., Chi	108.50	108.50	108.50	109.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective June 13, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	78.50-79.00	78.00-79.00	6/10/83
Lead	19.00-23.00	19.50-23.00	6/7/83
Magnesium ingot	138.00	134.00-138.00	6/1/83
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	4/27/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $215.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.55-$1.70
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $413.00
Indium, dollars per troy oz. $3.50
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$300-$310
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $11.625
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

June 6—596.72 June 9—597.68
June 7—597.17 June 10—598.29
June 8—596.84

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	77⅛	68¼
Yellow brass	64½	61⅛
Red brass	70⅝	65⅝
Comm. bronze	72¾	67
Mang. bronze	64⅛	61¼
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	69
No. 2 copper wire	61
Light copper	52

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	65
No. 2 copper wire	57
Light copper	48
No. 1 composition	56
No. 1 comp. turnings	53
Hvy. yellow brass solids	37
Hvy. yellow brass turnings	29
Radiators	45

Aluminum

New mixed clips	42	—43
Old sheet	39	—40
Old cast	39	—40
Clean dry borings	39	—40

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	33	—34
Mixed L.C. clips	28	—29
Old sheets and cast	25	—26
Borings and turnings	17	—18
Duraluminum clippings	28	—29

Copper and Brass

No. 1 copper wire	61	—62
No. 2 copper wire	54	—55
Light copper	48	—49
Radiators	38	—39
No. 1 composition	48	—49
No. 1 composition turn'gs	45	—46
Cocks and faucets	34	—35
Clean heavy yellow brass	32	—33
Brass Pipe	33	—34
New soft brass clippings	48	—49

Lead

Heavy soft lead	9	—10
Whole batteries	3	— 4
Type metal	15	—16
Electrotype	14	—15

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	50	— 60

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

EFFECTIVE JUNE 13, 1983

MATERIALS NEWSFRONT

(Effective June 13, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	61.00 to	62.00
No. 1 dealer bundles	87.00 to	88.00
No. 1 factory bundles (auto)	87.00 to	88.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	86.00 to	87.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	26.00 to	27.00
Cast iron borings	25.00 to	26.00
Low phos. punchings plate	88.00 to	89.00
Heavy turnings	61.00 to	62.00
No. 1 RR hvy. melting	88.00 to	89.00
Rails 2 ft. and under	103.00 to	104.00
Scrap rails, random lgth.	88.00 to	89.00
RR specialties	94.00 to	95.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	590.00 to	600.00
18-8 turnings	490.00 to	500.00

Chicago

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	84.00 to	85.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	44.00 to	45.00
No. 1 busheling	82.00 to	83.00
Shredder scrap	81.00 to	82.00
Machine shop turn.	17.00 to	18.00
Mixed bor. and turn.	18.00 to	19.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	37.00 to	38.00
Low phos. forge crop	89.00 to	90.00
Low phos. punchings plate ⅛ in. and heavier	98.00 to	99.00
Low phos. 2 ft. and under	93.00 to	94.00
No. 1 RR hvy. melting	82.00 to	83.00
Scrap rails, random lgth.	70.00 to	71.00
Reroller rails	94.00 to	95.00
Rails, 2 ft. and under	94.00 to	95.00
RR couplers and knuckles	82.00 to	83.00
RR car axles	112.00 to	113.00
No. 1 machinery cast	108.00 to	109.00
Cupola cast	95.00 to	96.00
Stove plate	94.00 to	95.00
Steel car wheels	82.00 to	83.00
Stainless		
18-8 bundles and solids	560.00 to	580.00
18-8 turnings	450.00 to	460.00
430 bundles and solids	135.00 to	140.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	80.00 to	83.00
No. 2 dealer bundles	42.00 to	45.00
No. 1 busheling	80.00 to	83.00
Shredder scrap	79.00 to	82.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	40.00 to	43.00
Low phos. 5 ft. and under	79.00 to	82.00
Low phos. 2 ft. punchings	89.00 to	92.00
Electric furnace bundles	93.00 to	96.00
RR specialties	81.00 to	84.00
Rails, 2 ft. and under	92.00 to	95.00
Cupola cast	58.00 to	61.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	51.00 to	52.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	36.00 to	37.00
No. 1 busheling	69.00 to	70.00
Drop forge flashings	45.00 to	46.00
Machine shop turn.	25.00 to	26.00
Mixed borings and turn.	15.00 to	16.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	15.00 to	16.00
Heavy breakable cast	34.00 to	35.00
Mixed cupola cast	50.00 to	51.00
Automobile cast	73.00 to	74.00
Stainless		
18-8 bundles and solids	470.00 to	480.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	46.00 to	49.00
No. 1 dealer bundles	78.00 to	81.00
No. 2 dealer bundles	37.00 to	40.00
Machine shop turn.	1.00 to	3.00
Shoveling turnings	5.00 to	8.00
Low phos. plate	74.00 to	77.00
Electric furnace bundles	71.00 to	74.00
Galvanized bundles	61.00 to	64.00

Cleveland

No. 1 hvy. melting	$ 60.00 to	$ 63.00
No. 2 hvy. melting	27.00 to	30.00
No. 1 dealer bundles	76.00 to	79.00
No. 1 factory bundles	74.00 to	77.00
No. 2 bundles	22.00 to	25.00
No. 1 busheling	76.00 to	79.00
Machine shop turn.	1.00 to	4.00
Mixed bor. and turn.	1.00 to	4.00
Shoveling turnings	3.00 to	6.00
Cast iron borings	6.00 to	9.00
Cut structural & plates, 2 ft. and under	92.00 to	95.00
Low phos. punchings plate	92.00 to	95.00
Drop forge flashings	31.00 to	34.00
Foundry steel, 2 ft. & under	57.00 to	60.00
No. 1 RR hvy melting	61.00 to	64.00
Rails, 2 ft. and under	97.00 to	100.00
Rails, 18 in. and under	98.00 to	101.00
Steel axle turnings	67.00 to	70.00
Railroad cast	80.00 to	83.00
No. 1 machinery cast	87.00 to	90.00
Cupola cast	60.00 to	63.00
Stove plate	45.00 to	48.00
Stainless		
18-8 bundles	325.00 to	335.00
18-8 turnings	275.00 to	285.00
430 bundles	80.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 busheling	38.00 to	39.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.	9.00 to	10.00
Mixed bor. and turn.	16.00 to	17.00
Shoveling turnings	17.00 to	18.00
Cast iron borings	15.00 to	16.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	50.00 to	51.00
Scrap rails, random lgth.	30.00 to	31.00
No. 1 machinery cast	71.00 to	72.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 63.00 to	$ 64.00
No. 2 hvy. melting	52.00 to	53.00
Foundry steel, 2 ft.	52.00 to	53.00
No. 1 dealer bundles	63.00 to	64.00
No. 2 bundles	49.00 to	50.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	63.00 to	64.00
Rails, random length	69.00 to	70.00
Rails, 18 in. and under	84.00 to	85.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	75.00 to	76.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	96.00 to	97.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 64.00 to	$ 65.00
No. 2 heavy melting	59.00 to	60.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	63.00 to	64.00
Shredder scrap	77.00 to	78.00
Machine shop. turn.	24.00 to	25.00
Shoveling turnings	35.00 to	36.00
Cast iron borings	35.00 to	36.00
Electric furnace bundles	62.00 to	63.00
Elec. furnace, 3 ft. & under	59.00 to	60.00
Structural and plate, 2 ft.	80.00 to	81.00
Structural and plate, 4 ft.	77.00 to	78.00
No. 1 RR hvy. melting	63.00 to	64.00
Scrap rails, random lgth.	68.00 to	69.00
Rails, 18 in. and under	84.00 to	85.00
Angles and splice bars	76.00 to	77.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	59.00 to	60.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	57.00 to	58.00
No. 2 bundles	27.00 to	28.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	8.00 to	9.00
Cast iron borings	11.00 to	12.00
Low phos. 18 in. and under	75.00 to	76.00
Rails, random length	60.00 to	61.00
Rails, 2 ft. and under	80.00 to	81.00
No. 1 cupola cast	60.00 to	61.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	69.00 to	70.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	480.00 to	500.00
18-8 turnings	380.00 to	400.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	44.00 to	46.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	44.00 to	46.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 42.00 to	$ 44.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	13.00 to	15.00
Machine shop turn.	6.00 to	8.00
Cast iron borings	6.00 to	8.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	30.00 to	32.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 dealer bundles	10.00 to	12.00
Machine shop turn.	6.00 to	8.00
Shoveling turnings	10.00 to	12.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under (foundry)	86.00 to	88.00
No. 1 cupola cast	88.00 to	90.00

Seattle

No. 1 hvy. melting	$ 59.00 to	$ 61.00
No. 2 hvy. melting	48.00 to	50.00
No. 2 bundles	38.00 to	40.00
No. 1 cupola cast	94.00 to	96.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 55.00
No. 2 heavy melting cut 2 ft. and under	52.00
No. 1 dealer bundles	60.00
No. 2 bundles	30.00
Mixed steel scrap	34.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	25.00
Short steel turn.	28.00
Mixed bor. and turn.	15.00
Cast scrap	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	34.00 to	36.00
Machine shop turn.	19.00 to	20.00
Crushed turnings	35.00 to	37.00
Shredder scrap	67.00 to	68.00
Cut structural plate 2 ft. and under	84.00 to	86.00
Unstripped motor blocks	58.00 to	60.00
Cupola cast	71.00 to	73.00

METALWORKING PRICE TRENDS

Prices go from falling to slight firmness

Producers' price tags in May showed just the slightest signs of firming a bit.

After two months of actual falling prices for producer finished goods, tags in May rose by 0.3 pct. May prices thus rose at an annual rate of 3.6 pct. Over the year, through May, prices of finished goods rose at only a 2.3 pct rate.

No real price turnaround is signaled. Simply, the price declines in March and April could not be expected to continue in the face of rising business activity. "No zooming price takeoff is foreseen," notes one price analyst.

Prices for metalworking product lines in May behaved in about the same way as did overall producer finished goods prices. The 22 metalworking product lines listed on the table here rose by a scant 0.2 pct average.

Overall finished goods prices in May were pushed up by good-sized jumps in some energy prices, which rose by 2.2 pct. That hike hit with a special impact in May, because it followed five straight months of declines in energy prices.

The energy price push came from home heating oil and gasoline prices, which were up 6.4 and 2.3 pct, respectively.

Natural gas prices continued to give ground in May, but not at the faster rates of previous months.

Prices of capital equipment rose by 0.2 pct in May. That rise followed a decline of 0.3 pct in April. The upturn is attributed to increases in some capital goods lines that showed declines in April. These included railroad equipment, machine tools and mining machinery.

Some capital goods lines that continued April prices through May included aircraft, generators and some instrument lines. Actual price declines in May were seen for heavy motor trucks and transformers.

Despite some signs of price firming in May, the overall producer finished goods price index showed a decline of 2.2 pct over the first five months of the year. In all of last year, this index rose by 3.7 pct.

A number of forecasts of producer prices for this year as a whole run between 1 pct and 2.5 pct. In the face of an overall price decline over the first five months of the year, these predictions point to definitely firming prices as the year goes on.

Even firmer prices through the year will mean moderate price increases as measured against recent years.

Latest Month Covered: May, 1983

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	378.8	+ 0.9	+ 2.8
Metal Forming Machine Tools	415.3	+ 0.1	+ 3.9
Agricultural Machinery & Equip.	326.0	+ 0.4	+ 5.8
Construction Machinery & Equip.	352.2	+ 0.4	+ 2.5
Industrial Process Furnace & Ovens	360.1	− 0.3	+ 2.2
Industrial Material Handling Equip.	284.8	0	− 1.0
Pumps, Compressors & Allied Equip.	347.4	− 0.1	− 0.4
Fluid Power Equip. (Dec. 1970 = 100)	252.1	+ 0.3	+ 3.7
Mechanical Power Transmission Equip.	315.4	+ 0.2	+ 1.0
Automobiles	217.3	+ 0.4	+ 2.9
Motor Trucks—Light	270.2	0	+ 2.5
Motor Trucks—Heavy	312.9	− 1.5	+ 3.6
Railroad Equipment	357.1	0	+ 4.2
Fabricated Metal Structural Products	302.1	− 0.2	− 0.9
Electric Motors	304.1	+ 0.3	+ 3.8
Valves (Metal, Ex-Fluid Power—Dec. 1982=100)	100.7	+ 0.4	NA
Ball & Roller Bearings	331.2	0	− 0.8
Cutting Tools & Accessories	275.6	+ 0.3	+ 1.3
Heating Equipment	242.4	0	+ 2.2
Plumbing Fixtures & Brass Fittings	288.8	+ 0.5	+ 2.8
Metal Containers	337.4	+ 1.6	+ 2.2
Miscellaneous Metal Products	284.9	− 0.1	+ 0.1

Data based on U.S. Labor Dept.'s Producer Price Index

Chilton's

THIRD QUARTER FORECAST: THE ECONOMY GAINS STEAM

JULY 4, 1983

IRON AGE

THE MAGAZINE FOR METAL PRODUCING MANAGEMENT

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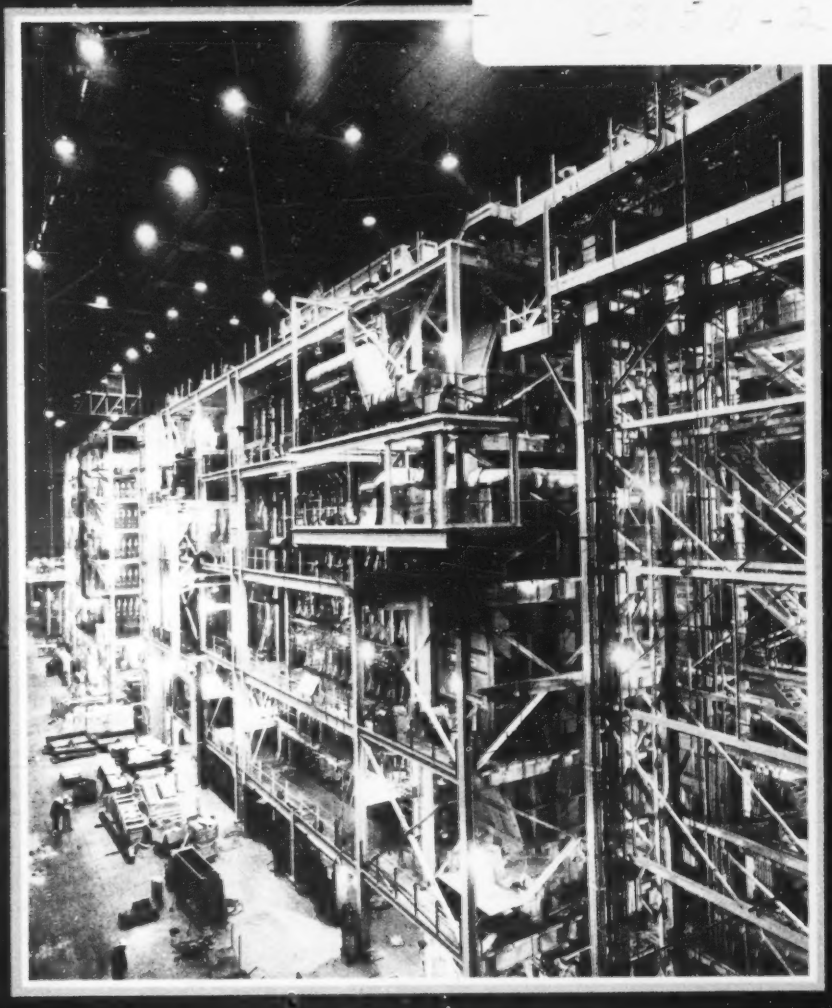

CONTINUOUS ANNEALING

Solving Old Problems With New Technology

VOL. 226, NO. 19

IRON AGE

JULY 4, 1983

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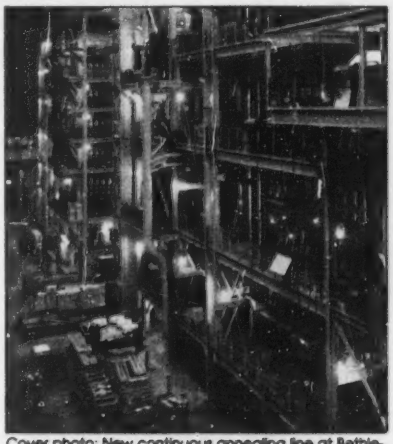

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Quality in America: Part I in a series.

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THE ECONOMY GAINS STEAM

Forecasters now look for a strong recovery this year. The big push: Consumer spending. The big drag: Plant investment.

In recent weeks, most economists have lifted their sights on the short-term outlook for the U.S. economy.

Right now, forecasts for real GNP growth run in the 6 pct to 9 pct range for the second quarter.

This is a thumping hard gallop following six quarters where growth averaged less than 1 pct a period. It will be known in a few weeks whether or not the economy actually hit that pace in the June period. That is when the U.S. Commerce Department will release its preliminary GNP data for the quarter.

Most economists, who are putting out the bright and shining numbers on the second quarter, see a letting up on the pace in the third period and then a return to a fast track in the closing quarter.

These upbeat forecasts reflect a new wave of bullish sentiment on the strength of the fledgling recovery.

"Every published forecasting model now no longer has any choice but to revise its forecast estimates strongly upward," says Albert T. Sommers, chief economist of The Conference Board. "Coming from so far down, the energy of this recovery is awesome."

Executives in metalworking product lines still deep in the doldrums have reason to shake their heads in doubt when they hear all this happy shouting.

But Mr. Sommers, for one, sees their day coming. He says the U.S. economic recovery is "still accelerating" and is likely to spread soon even to the country's deeply depressed capital goods industries.

Just what is it the seers now see when they lift the lid on the economy and peer in?

They see, first of all, a come-back-to-life consumer. In many cases, he is getting his old job back; his real earnings are rising as inflation gives more ground; he is freely and confidently taking on new debt.

And, most importantly, the consumer is putting his money on the line for more goods and services.

The numbers are there. In April and May, payrolls in U.S. industry increased by almost 700,000 workers. The GNP fixed-weighted price index in the first quarter ran at an annual rate of 3.2 pct—about half of what it ran for all of last year. Too, April marked the second straight month that consumer installment debt rose by more than $2 billion.

And to top it off, in May, retail sales rose a strong 2.1 pct. That month saw the biggest monthly jump in sales in nearly six years at the nation's department stores and other general merchandise outlets. Big-tag goods like appliances and some lines of autos (the big ones, especially) are selling briskly.

Auto sales at mid-June were running at a seasonally adjusted annual rate of 7.4 million units. This was up from a 6.7 million unit rate in May.

Another sign of strong recovery was seen in the latest data on housing starts. In May, they rose 19.1 pct to a seasonally adjusted annual rate of 1.79 million units—the highest since September of 1979.

And, closer in to the factory and to metalworking, industrial output through May was on the rise for the sixth straight month. With output on the rise, manufacturing plants have become busier. The latest data from the Federal Reserve Board shows U.S. factories operating at 72 pct of capacity—the highest level since February 1982.

Notably, much of the increased factory output very recently has been in long-lagging lines.

In looking at all these hard signs of a rolling consumer recovery, and to the upcoming 10 pct Federal income tax cut in July, U.S. Commerce Secretary Malcolm Baldridge notes that they point to "further strong gains in consumer spending."

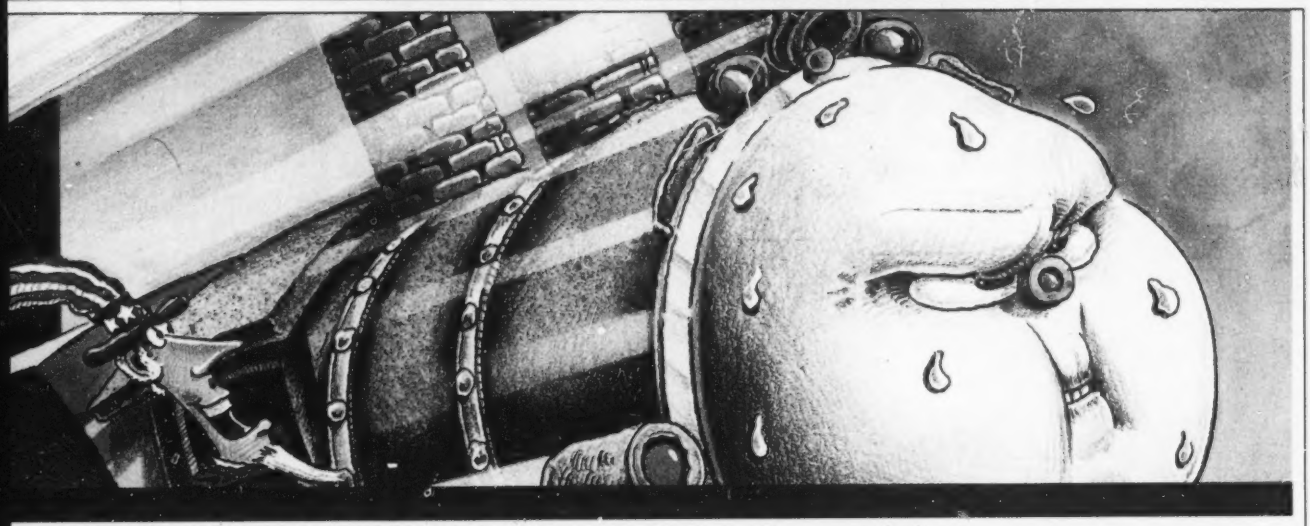
The rising tide of consumer end-product buying has just started to give a strong lift to the whole economy.

Durable goods manufacturers, making everything from those end products to the equipment that produces them, are showing early signs of busy days ahead. Their incoming orders in April were up 4 pct over March, and up more than 7 pct from February.

Also, an April rise in inventories held by durable goods producers apparently marked an end to many, many months of inventory runoff. That is a sure signal of a rising trend in new orders in coming months. No longer can many durable goods factories turn to their stocks on hand to fill incoming new orders. They must start ordering themselves.

As the chart here on durable goods new orders shows, a 'bottom' was likely reached in the closing quarter of last year—a monthly average of $72.3 billion. In the opening period this year, orders rose to a $79.9 billion monthly average. And, based on two months of actual data, *Iron Age* estimates that orders in the June period hit $83.9 billion. By year end, a monthly rate of $91.3 billion is foreseen, up a very strong 26 pct over the same period a year earlier.

QUARTERLY FORECAST



As is always the case in the early stage of a business recovery, not all industries have yet been given a lift by the current upswing. For many machine tool builders, for example, the recovery bandwagon is still perceived as nothing more than the distant sound of music.

That brings up a source of real concern in the economy. Spending on new plant and equipment might well lag the recovery far more than usual this time around. Two important recent projections highlight this possible problem.

In April and early May, the Commerce Dept. made its latest quarterly survey of business executives on their plant spending intentions for this year. The news was less than cheery.

The survey found that U.S. industry, after allowing for inflation, would spend 3.1 pct less on capital spending this year than in 1982. (The chart here shows projections of this survey covering manufacturing in 1983).

And 1982 was a bummer; plant spending was down 5.5 pct from the previous year. And in 1980, plant spending was up only an anemic 0.2 pct.

At about the same time last month that Commerce officials were announcing the dark news on plant investment plans, the Conference Board reported the results of its latest survey on capital appropriations by the nation's 1000 largest manufacturers. It was more bad news.

Manufacturing industry executives, excluding those in petroleum, told the board that they set aside some 8.1 pct less for appropriations in the first quarter compared to the previous period.

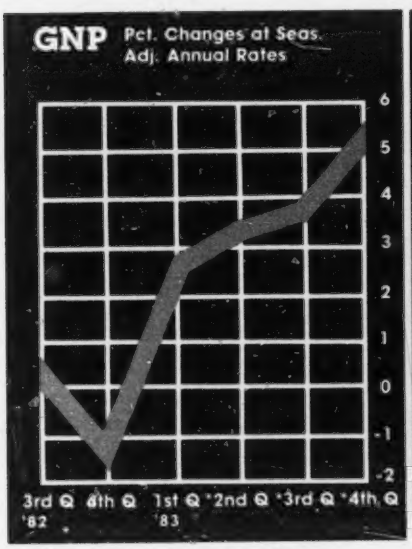
"Expectations for 1983 were again revised downward," said Lora S. Collins, director of the board's Business Conditions Analysis. "The current outlook is for capital appropriations to rise only 6 pct this year. Excluding petroleum, appropriations are expected to be up only 1 pct."

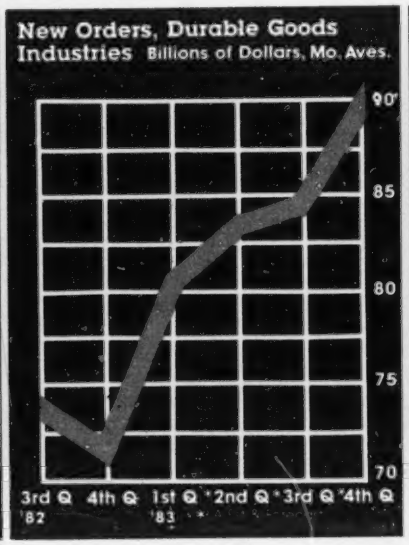
There are concerns about the staying power of the current recovery. These center, for one, on the possibility of strained credit markets and soaring interest rates as government budget deficits and rising business volume push both the government and the private sector into big borrowing binges.

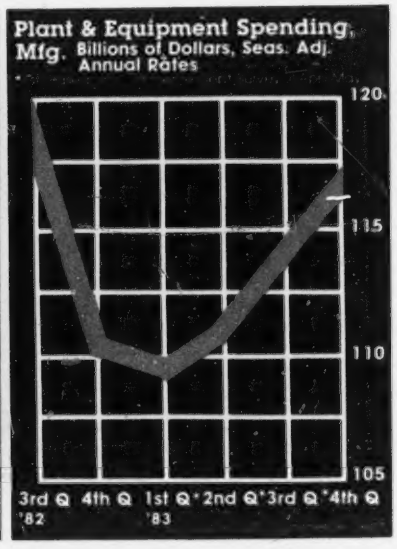
The other concern is the widely-anticipated plant investment drag. After all, there has never been a sustained recovery without strong capital investment.

But these are concerns that really have meaning for 1984 and beyond. Right now, however, it looks like 1983 will be a year of steady improvement in business as the year rolls on.

John Baxter







QUARTERLY FORECAST

Steel

For steel mills, it is not a question of when the recovery will end, but when it will start.

Steel shipments have moved up from the depths of 1982, but demand is still at a depressed level. The market is too weak for the mills to collect published prices or make money. There is no pressure on users to make advance commitments or to buy more than minimum quantities.

There is no sign, either, that things will get much better in a hurry. Mill officials think the trend is upward. A typical forecast calls for shipments to rise from 17 million tons in the second quarter to 18 million tons in the third quarter.

Going into July, however, the mills weren't even sure how much tonnage would be shipped in that month. Last minute orders will determine the exact volume. It's entirely possible shipments will be down, not up, in the third quarter.

This may seem surprising because the steel market is technically in its seventh month of recovery. The first quarter was better than the fourth quarter in 1982. The second quarter was better than the first.

At this stage of past recoveries, demand would often start to feed on itself. Improved orders would tighten supply a little. Users would then want more inventory protection and this would bring a further tightening of supply.

It looked as though this snowballing action was starting when orders surged in January and February. Then on March 1, a labor agreement eliminated the threat of a steel strike. At about the same time, it became clear the mills weren't going to be able to put through significant price hikes.

With no need to hedge against price hikes or a strike, users abruptly ended their order spree. Steel shipments rose to nearly 6 million tons in March, then fell to under 5.4 million tons in April. Mill officials suspect the April drop reflected production problems. It's believed shipments have been moving essentially sideways since March.

The trouble with the recovery is that the starting point was down near zero. That is true of the steel market and probably the whole industrial economy. Business is better, but it's still lousy.

The economic pattern is reflected in lopsided steel activity. The partial recovery of the auto industry has lifted operations of sheet mills to 70 or 75 pct of capacity.

The continued lag in capital spending has left plate and structural mills operating around 40 pct of capacity. Producers of oil country seamless goods are down to about 20 pct of capacity.

The general state of the market is indicated by the fact that users continued to liquidate steel inventory in the second quarter. The reductions were concentrated in the oil country market. But in all markets, people were content to operate with skimpy inventories.

Making for added confusion about the immediate outlook is the steel buying program of General Motors Corp. As it did last year, General Motors is having steel companies bid for its business over the next model year.

The bidding procedure was drawn-out and shrouded in secrecy. Mills were called on to bid for particular auto parts. This meant qualifying steel for applications as well as submitting prices. There were repeated delays in making awards and by mid-June, the program still hadn't been sorted out.

While carbon sheet producers were waiting for General Motors to decide their fates, specialty mills were waiting for President Ronald Reagan to decide theirs. The President was scheduled to act by July 5 on the specialty industry's request for import quotas.

The International Trade Commission has ruled that the domestic specialty producers are being injured by imports. On May 6, the commission recommended that quotas be imposed for three years.

Meanwhile, the market outlook for specialty grades is mixed. There is brisk demand for stainless flat rolled, which goes into autos and other consumer products. Despite good volume, there are chaotic prices in the stainless sheet market.

Demand for stainless bars and plate continues to lag. Also slow is the tool steel business. Imports captured more than 56 pct of the domestic tool steel market in 1982.

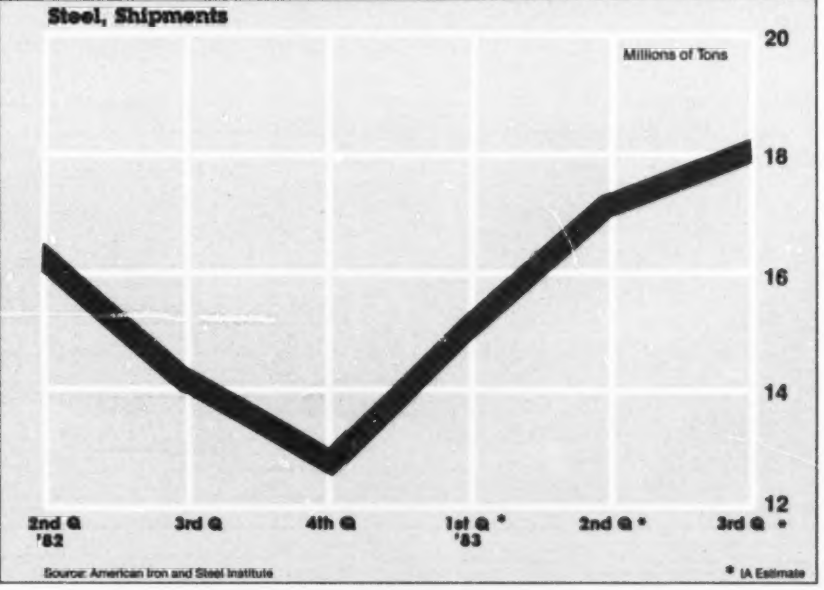
Still pending in June was the proposed agreement calling for steel slabs to be shipped from the Ravenscraig plant of British Steel Corp. to the Fairless Works of U. S. Steel Corp.

The Steelworkers say the use of foreign steel by Fairless would be the opening wedge that would force others to do the same thing. U. S. Steel argues that it can't afford to modernize the entire Fairless Works.

The whole steel industry is now past the 18-month mark of a deep recession. Business has got to improve soon or there will be plant and company shutdowns.

For nearly a year and a half, steel mills have been shipping more steel than they have been producing. In 1982, raw steel output of 72.9 million tons compared with finishing steel shipments of 61.6 million tons. The apparent yield of 83 pct actually reflected the liquidation of 5.5 million tons of mill inventory.

Despite this big slash, producers reduced their inventories by another 400,000 tons in the first three months of 1983.



QUARTERLY FORECAST

Nonferrous

It wasn't hard for the nonferrous metals producers to score gains in shipments during the first half of 1983, considering how bad things were on the shipping docks during the first six months of 1982. The elusive factor remains profitability and to recapture that, the producers will need further improvement in demand and higher prices.

Prices for aluminum, nickel and copper improved to varying degrees during the first half—in most cases a matter of crawling up out of the subcellar into the basement—but zinc prices were static and lead actually lost some ground.

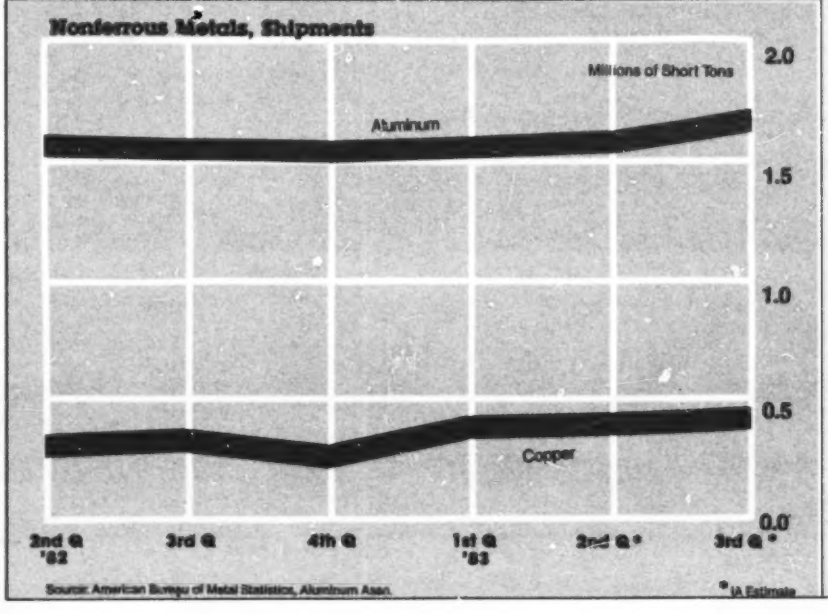
The economic improvement continues to grope its way forward at a much slower pace than the stock market, and the chewup rate for base metals has improved. Consumers haven't been prompted to rebuild meager working inventories yet, however, despite lower interest rates (compared with last year) and improving price trends.

On the consumption front, domestic passenger cars were up about 8.2 pct going into mid-June, but foreign cars continued to claim a 27 pct share of the total U.S. market. Residential construction was stronger earlier in the year but appeared to be pausing for breath while the forecasters pondered the possibility of an upturn in mortgage rates. Capital spending remained in the doldrums.

Some early wage pact settlements took the edge off a modest price recovery on the copper markets as the year neared the half-way mark. Hedge market inventories climbed almost relentlessly during the first half, but U.S. refiners managed to pare their own stocks somewhat.

Economic, political and labor difficulties were seen posing some threats to copper production in South America and Africa but, with visible supplies ample and industrial requirements here and abroad still far from robust, the speculative fraternity maintained its cautious posture and prices were held in check. The other jaw of the clamp about the head of domestic producers, foreign producer output and pricing geared to foreign exchange and sociopolitical needs, also maintained its pressure. Meanwhile, traders and producers were waiting to see what the Chinese decide to do with the large stock of London Metal Exchange (L.M.E.) copper they were holding paper title to.

Some of the sharp runup in free market aluminum prices during the opening months of 1983 also reflected Chinese buying on the London exchange and elsewhere. A lot of the impetus, however, came from the sharp cuts in production—mainly in the U.S. and Japan—that carried into the early part of the second quarter. U.S. producers have been reactivating idled capacity at a quickening pace in more recent weeks, however, and the third quarter will show how accurately they have gauged the market. L.M.E. prices toward midyear still hadn't caught up with recently established transaction prices for primary ingot.



The producers tied the output cuts mainly to a need to adjust their own inventory levels, but also cited a better incoming order level. And, with some industry leaders predicting that a sizable chunk of idled capacity may never come onstream again, an argument can be made for higher production to head off annoying stringencies if the economy picks up more steam.

Incoming orders for ingot were up sharply in the first third of the year, but showed some signs of flagging in April. Orders for can stock were up slightly from the same 1982 period, but orders for other sheet items and plate were up smartly to rates topping prerecession levels. Export business remained poor.

The spot price for nickel by midyear was up more than 50 pct from its November 1982 low, but as one major producer noted, "No producers make money at this ($2.24 a lb) price." Nickel suppliers are forecasting a 13 pct gain in free world nickel consumption this year to about 1.1 billion lbs but this will just put the nickel industry back where it was in 1975.

The nickel companies have managed to pare their inventories considerably this year, thanks to deep production cuts and modest improvement in consumption by manufacturers of consumer durables. The missing ingredient, capital goods expansion, hasn't shown its colors yet, however. Meanwhile, the Western producers are keeping a weather eye on Russian nickel exports, which claimed about 9 pct of the free world market last year after a jump of about 70 pct.

Domestic zinc producer shipments were up modestly in the first half of this year, but the main prop to static zinc prices has been a tight rein on production that has pulled down producers' inventories. Zinc industry sources expect price improvement in the second half as the chewup rate improves with better car production and as producer stocks here and abroad continue to tighten.

The continuing decline in lead consumption for cable sheathing, sheet and pipe products, and tetraethyl lead leaves the domestic lead producers more and more dependent on the automotive replacement battery market, the service life of which has been increasing while the lead content level has been decreasing. Lead refiners' stocks have risen notably again this year because production has been rising faster than shipments and output curbs appear to be in the offing.

QUARTERLY FORECAST

Auto

Sales of U.S. cars in the second quarter reached their highest level since the third quarter of 1981. The automakers expect the selling rate to rise further in the third and fourth quarter. If so, sales in 1982 will exceed those in 1981 and 1982 and equal those in 1980: 6.6 million domestic and 2.4 imported passenger-car sales.

"We continue to see an upturn and improvement in sales," says an analyst for one automaker. "However, this is not a recovery. A recovery would be total sales of 10.5 million, not 9 million. We might see that rate in the middle of 1984 or in 1985."

Other auto executives are more cautious. "We'll sell 9 million cars if we're lucky," says one Big 3 chairman. "But it might be just 8.5 million."

Automakers likely will produce 1.6 million cars in the third quarter of 1983, up sharply from the 1.2 million built in that period last year. Production in the second quarter of 1983 was 1.8 million, up from 1.6 million in the second quarter of 1982. Dealers now have fewer than 50 days of inventory; 60 days is average.

Large cars continue to account for 13-14 pct of total industry sales, up from the low of 10 to 11 pct two years ago. As in the second quarter, automakers will continue to offer incentives to buyers of small cars. Automakers need to sell small cars to meet goverment requirements for a corporate average fuel economy (CAFE).

"Our full-size and intermediate cars are selling at very close to production capacity," says one Big 3 vice president in charge of sales and marketing. Chrysler also is running most of its plants at full capacity.

"The recovery is underway," says another vice president, "and consumer confidence about buying a new car is at its highest point in over 30 years."

Cars in the U.S. now are the oldest they've been since the mid-1950s. The average age of all cars is more than seven years, compared with six years in 1975 and 5.5 in 1970.

While offering incentives for small cars, the Big 3 automakers have raised the prices of their large cars.

All the Big 3 automakers likely will make big profits in 1983 and bigger profits in 1984 and 1985, say Wall Street analysts. In the first quarter of 1983, Ford's North American Automotive Operations earned their first operating profit in four years; and Chrysler recorded the highest single quarterly earnings in its history.

Imports in 1983 will continue to capture 27 or 28 pct of the U.S. market. The Japanese automakers will limit imports to 1.7 million between April 1983 and April 1984. It's uncertain whether they'll continue that restraint next year, whether the U.S. Congress will pass local content laws, and how an upturn in the U.S. auto market will affect these issues.

Machine Tools

The slow increase in machine tool orders has some companies convinced that 1984 will be a very good year, but not necessarily for all American builders.

"Expendables have shown some good increases and our inquiry level for stand-alone machines is up," says one builder. "There are some particularly hopeful signs in automotive as well," he adds.

Major systems makers are the most optimistic, for the long-term at least. "If Detroit opts for the flexible machining route, we'll be in a boom situation by the end of the year," says a major manufacturer of such systems.

However, there's a large cloud over the whole machine tool picture in the U.S., sources tell *Iron Age*, and it has nothing to do with interest rates, labor rates or inflation rates. "The Japanese overhang is going to keep a lot of domestic builders very unbusy during this recovery," says an executive with one large U.S. company.

The "Japanese overhang" he's referring to is a stockpile in this country of several thousand new machines that will be discounted heavily during the recovery. "Until they're sold, there will be no recovery for a lot of us," says the executive.

Those companies that compete in the various NC lines that the stockpile represents will not be able to "match the money" says one source. "The discounts are huge."

Meanwhile, the industry remains split as it's never been over "232" and the whole issue of foreign builders.

Some U.S. builders expect the "Asian Invasion" to continue relentlessly until all but the biggest American companies remain. "That's the purpose of the discounted stockpile," says one expert.

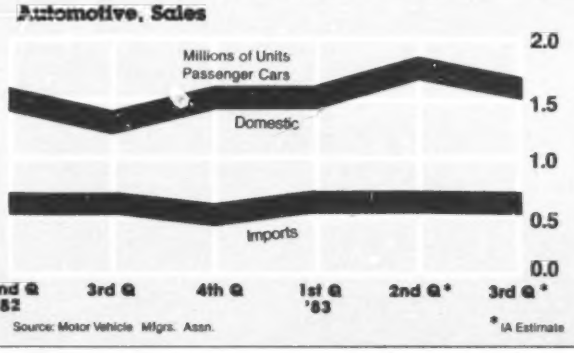
Some believe "232" will give the domestic builders an absolutely essential reprieve.

But still others feel the approach is inappropriate and counter-productive. Not a few domestic builders are against the petition.

Simply put, the American machine tool industry is not of one mind on imports. Various multinational arrangements keep some builders from being supportive of any restrictions on foreign participation in the U.S. market. Others are downright loud in their support for relief, from Japan in particular.

The question according to some leading industry managers is where will America's much needed retooling be built and by whom.

So as the recession seems to indeed be over and recovery on the way, U.S. machine tool builders face an uncertain future. The market is researching the latest technology and U.S. builders have it. Unfortunately, the market is also researching the latest prices and that is where some U.S. builders find their pessimism.



QUARTERLY FORECAST

Instruments & Controls

The sales of instruments and controls will pick up a sluggish 1-2 pct in the third quarter. This pickup follows growth during the second quarter of under 2 pct.

However slow the growth, at least business is on the upswing from a depressed third quarter of 1982. Business will continue to languish until capital spending picks up.

"I don't see that happening this year," said one industry spokesman. "Companies are going to need more confidence in the economy and get a little more money under their belt before they are going to open their wallets for more capital equipment."

Before new equipment is bought, firms must first get the old equipment running again. As old manufacturing lines come back on line, the replacement market for instruments and controls should increase steadily.

Also, before sales pick up, the overseas market must improve. U.S. producers of analytical instruments typically export 40 pct of their products, with the large majority of these going to Western Europe. Overseas sales remain depressed because of the continuing strength of the U.S. dollar in comparison to other currencies. Also, foreign countries are still fighting to overcome the worldwide recession, although there are signs of recovery overseas.

Real growth for the year should approach 4 pct, with small sales increases through the third and fourth quarter. As the general economy improves, sales of instruments and controls generally lag the recovery by six months.

As the U.S. emerges from the recession, it is finding itself in an increasingly competitive world market. To compete favorably, U.S. firms are going to be looking for productivity and quality improvements in their manufacturing operations. Instruments and controls will be an integral part of this reindustrialization effort; however, this will probably not begin in earnest until the first half of 1984.

The instrumentation industries include SIC 3811, engineering and scientific instruments; SIC 3822-24 and 3829, measuring and controlling instruments; SIC 3825, instruments for measuring electricity; and SIC 3832, optical and analytical instruments.

The measuring and controlling instruments sector is the largest and the most applicable to metalworking, and also the slowest to recover from a recession. Industry observers see little growth for the sector through 1983.

"Why would anyone want to buy instruments if the machinery this equipment is supposed to monitor is not running," says one spokesman. "First, get the equipment running again and then worry about the instruments."

This sector does have a few bright spots, however, the replacement market is holding steady and sales to housing-related industries such as home appliances are strengthening.

Computers

Several industry observers are sticking to their year-end predictions that the computer industry will grow 18 pct during 1983.

For the year, shipments could reach $43 billion dollars. Shipments for the third quarter should exceed $10.1 billion. For the remainder of the year, each quarter should be a slight improvement on the previous quarter.

"The third quarter is expected to show a slight increase over the second quarter, but how much depends on several factors," comments an industry spokesman. "Growth is linked to some extent to the general economy here and also to some of the key economies overseas."

For the first four months of 1983, computer exports rose 16 pct above the similar period in 1982. That is 4 pct below earlier predictions. This drop in expected revenues is significant because some 30 pct of U.S. computer sales are to foreign buyers.

"Exports are still not what they should be. There is still some weak demand overseas because of the lingering recession and also the dollar remains strong," says one industry analyst. "But if they come out of their recession, especially the one affecting Europe, we should see some export growth."

Significantly, in recent months, the U.S. has developed its first trade deficit with Japan. Much of that comes from peripherals that Japan makes for U.S. computers.

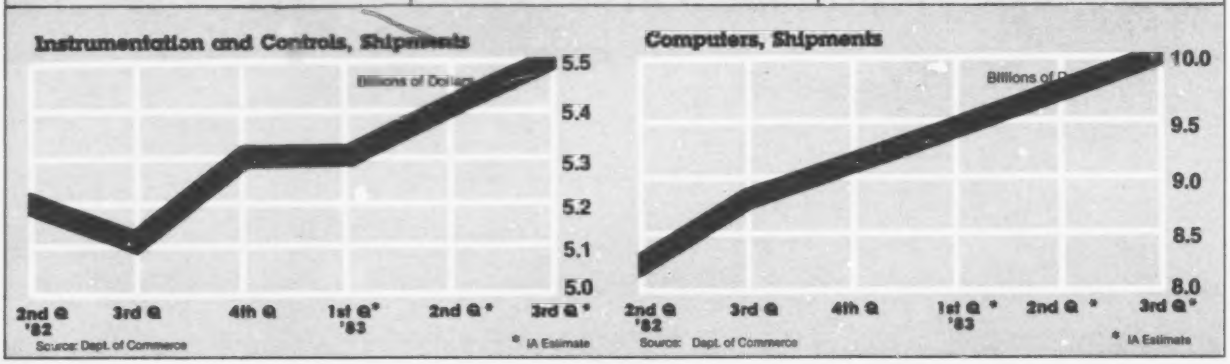
Going into the third quarter, some areas of computer sales are holding up particularly well. "The whole personal computer (microcomputer) area is very strong; that goes for complete systems as well as the pieces that go into them," reports an industry member.

Firms that sell the top of the line personal computers are doing well. In the lower-price sector of the market, the computers are selling, but because of heavy competition and price cutting, a number of firms are taking a bath.

The super-mini computers, "especially those with 32 bits, are still pretty healthy," says another industry analyst. "Display terminals, to the extent that you can ship them out the door, are selling."

Pieces of systems, such as large scale disc storage as well as smaller versions, are doing well. On the other hand, large system users are still storage-hungry for more sophisticated larger database applications. The low end of the industry is being fed by the rapid growth in small computers.

According to several sources, one thing to look forward to for the second half of 1983 will be an increased number of new product introductions.



QUARTERLY FORECAST

Metal Coatings

Shipments of product coating materials virtully reflect the trend in the general economy.

The latest complete figures are those for the first quarter of 1983 and these show only a slight gain (about 1 pct) in shipments over those of the fourth quarter of 1982.

But they're still well below the figures posted for the previous three quarters of 1982.

The producers of coatings for OEM products are still being hurt by the misfortunes of their best customers.

However, it's not all gloom because some bright spots are beginning to appear for the coatings industry. For example, the coil coating industry weathered 1982 and has written it off as "the year of recession"—the year it suffered along with its major customers industries.

Despite this, shipments of precoated steel and aluminum to the furniture and transportation industries remained on an even keel. It might be added that transportation is the largest single market for coated coil. Shipments of coil coated with a weldable zinc-rich primer actually increased, thanks to the automakers specifying this material for more parts and for more car models.

Coil-coated aluminum going to the container and packaging industry showed only a small decrease in shipments, while precoated steel posted a significant increase.

Some producers of industrial coating materials point out that a good part of the slippage in shipments and usage is directly attributable to the much higher efficiency of today's coating equipment and newer coating processes.

Once some of the coating industry's biggest consumers—autos, appliance, housing and the like—come back to life in a big way, coatings shipments will also bounce back.

Plastics

The plastics industry has had its ups and downs over the past couple years and is now on an upward trend. The final figures for the first quarter of 1983 show a gain of close to 8 pct in the sales and captive use of plastics resins over the figures of the first quarter of 1982. In fact, the first 1983 quarter fared better than any quarter of 1982.

This improvement over recent months and the pent-up demand for plastics bodes well for the industry for the remainder of the year.

As for reinforced plastics/composites, all markets are still expected to register gains over 1982. The marine market, which has been in the doldrums for quite some time, looks for a modest increase in shipments of about 2.2 pct.

Consumer products at the other end of the spectrum is expected to show a gain of 15-16 pct.

Industry experts are still sticking with an overall growth in shipments for 1983 of about 8.4 pct for reinforced plastics. Some industry marketing experts think the growth could reach 15 pct.

In the automotive field, with the use of lighter materials and the projection of annual production of 6.1 million cars, the plastics industry forecasts that shipments of composites will reach about 402 million lbs by the end of 1983.

The construction industry is looked upon for a 5.8 pct increase in 1983 which overall is less violatile than the housing segment alone. Reinforced plastics are also gaining ground in corrosion-resistant applications—pipes, pumps, tanks—and are expected to show an increase in shipments of more than 7 pct over 1982.

As things now appear, reinforced plastics, as well as plastics generally, will have a better year in 1983 than they had in 1982.

Fluid Power

Despite a faltering in incoming orders in April and May, fluid power manufacturers advanced in the second quarter.

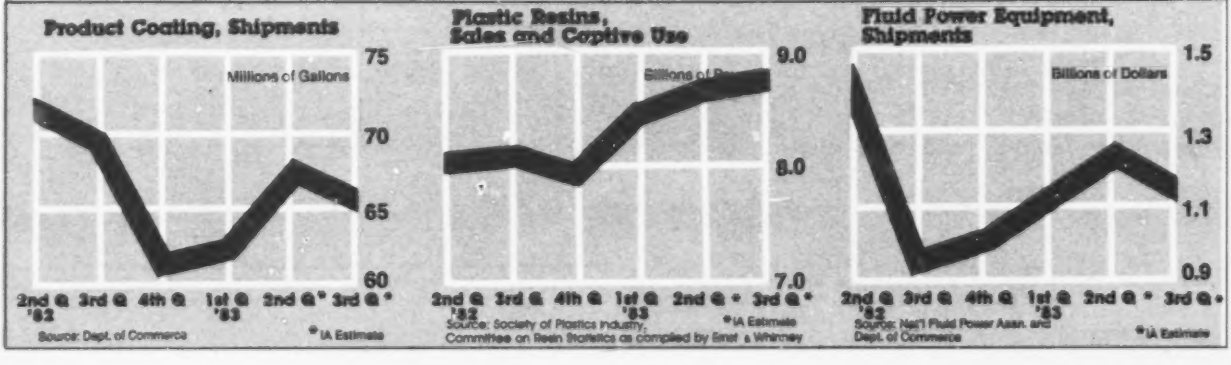
The industry was twice-cautious as 1983 began. It pegged its first half forecasts low and admitted it was doing so. And for some market areas, like heavy mobile equipment, that proved to be a good idea. Some suppliers to the construction and farm machinery makers report there was no change in their order volume through the first and second quarters of this year, a time when suppliers to some other capital goods markets and consumer durable markets, were beginning to feel a little better about the 1983 outlook.

Now, even these suppliers to the mobile equipment market, which had been the weakest sector during 1982 and early 1983, are beginning to talk about a recovery in the fourth quarter.

Said one supplier to mobile markets, "First quarter was flat with almost no gain over the low figure we hit in fourth calendar quarter of 1982. And second quarter was really no better. But in the July-September period, we should begin to show some improvement."

Export markets are still a mixed bag, however. In the past, foreign markets have tended to lag behind the U.S. in a world market recovery. This is changing. Now, the strong U.S. dollar is crimping U.S. sales of export finished goods. Europe and other overseas producers are beginning to ship more equipment into third world markets and are buying components for these finished machines from U.S. fluid power producers with plants abroad.

So this year, when most U.S. exports are down, a few fluid power companies are seeing a recovery in their foreign markets at a faster pace than domestic markets.



QUARTERLY FORECAST

Construction

A confused construction machinery market is further complicated by continuing soft prices. Even though builders of construction machines have trimmed back inventory in the past six months by production cuts, the backlog of used equipment at bargain counter prices is still holding down the dollar volume of sales for the entire industry.

Traditionally, second quarter sales of construction machinery are the highest of any calendar quarter of the year. In the third quarter, that machinery is already sold and out working on construction sites. So factory sales of new equipment drop, usually by about 12 pct. Fourth quarter, traditionally, sees another, even steeper drop below the third quarter level.

The industry also saw its biggest member, Caterpillar Tractor Co., end its long strike. The absence of Caterpillar for seven months (only four plants continued in operation) took out the biggest single source of construction machinery in the world. Now, 15 plants are available to begin building equipment, but Caterpillar isn't rushing to get up output, judging by suppliers reports.

Some equipment builders are even saying that dealer inventories of some lines of equipment may be too low, which is why they expect third quarter to look a little better than it usually does. Despite this and the fact that a few equipment builders have raised their manufacturing rates slightly on the strength of their third quarter forecast, *Iron Age* is still expecting some third quarter sales decline, though less than usual.

There were signs of this last year, when third quarter sales dropped only 2 pct and another 2 pct again in the fourth quarter. In fact, direct dealer sales may have fallen further in the first quarter of this year.

Farm

Moving into the third quarter, the farm equipment industry faces what is usually the lowest sales quarter of its marketing year.

Despite the bad things you used to hear about the Payment-In-Kind program, the prospect that farm net income could get a boost from PIK payments, or credits advanced against them, produced some surprising sales gains as early as first quarter of 1983.

Most analyses of farm machinery sales tend to focus on tractor sales. Tractors didn't do well in the first half. But combines, the second of the big ticket items, soared a completely unexpected 30 pct in retail sales in January. In February, they ran almost 39 pct over the year ago period, according to data on retail sales compiled by the Farm & Industrial Equipment Institute (FIEI). By April, the combined total for the year-to-date was still running 23 pct over the year ago period.

Even tractors didn't look as bad. They were running 27.8 pct below year-earlier sales in January. By April, the FIEI found, they had whittled that down at least to a 16.5 pct lower figure for the year-to-date, against the 1982 period. Some other equipment items—mower conditioners and balers, for example—were running strongly ahead of the year ago period.

This doesn't get the farm equipment industry out of the rough ground, but it looks like it's beginning to point in the right direction. The short line equipment builders, smaller companies that specialize in a few types of equipment, were already pointing out that change in feelings about PIK and the lessening of gloom over 1983 as early as February and March. Some of these had already begun moderate production increases by that time.

Mining Equipment

"It hasn't been this bad this long since I can remember," says one veteran iron or mining expert. Some iron ore interests have even considered researching other uses for iron ore.

"Even if steel starts booming in the states," he says, "we're not certain that we'd be competitive with foreign ore and if this unfinished trend continues, we're out of the picture."

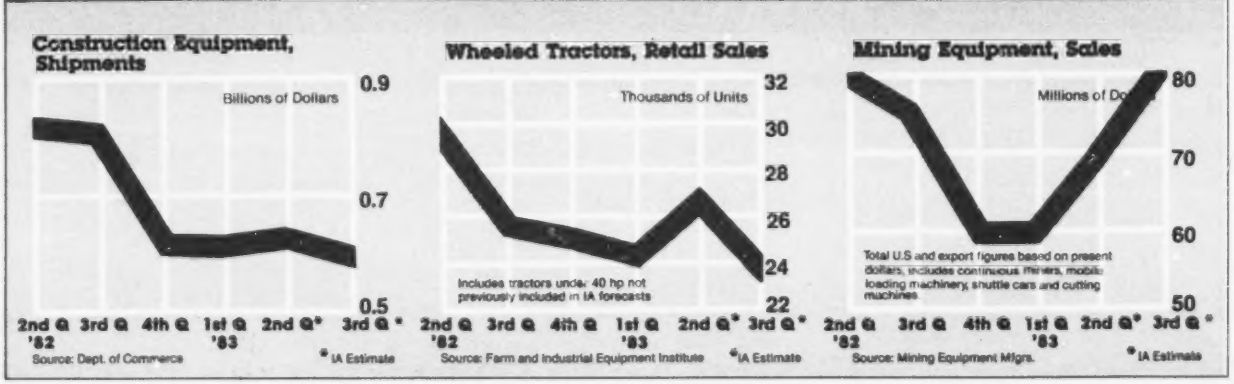
The problem is simple in iron ore mining: over-capacity worldwide. The industry has built efficient mines all over the world, including the traditional areas of upper Michigan and Minnesota in the U.S. As far as U.S. iron ore mining is concerned, there are no plans for any more. In fact, iron ore mining activity these days is not a matter of new mining ventures at all. Activity is measured in terms of reopenings, not ribbon cuttings.

Coal mining equipment manufacturers, on the other hand, are relatively optimistic about the rest of 1983. "I'm happy to see that the summer is shaping up hot and humid," says one coal industry analyst.

Hot and humid means something rather pleasant to coal equipment people: air conditioning. "We see a steady increase throughout '83 in coal burning by utilities and that translates into good business for the coal mining equipment people," he adds.

"We like a long, hot summer," says one manufacturer. "I'd feel safe predicting a good 20 pct increase in '83 over '82 for coal-related equipment, both because of the weather and the general increase in business activity."

Others note that the coal industry has been boosting its applications of high technology equipment. This will translate into more profitable operations in the months ahead. Continuous miners and other types of modern mining equipment are profit makers when volume allows.



QUARTERLY FORECAST

Material Handling

"We see '83 up a good 20 pct over '82," says a major manufacturer of material handling equipment.

Most managers in the industry note significant increases in inquiries over last year and are predicting a steady improvement throughout 1983.

"Our only major fear is in the area of interest rates. Some of what we make is big ticket stuff and is often tied into even bigger ticket projects. A point or two is a very big factor in the decision to go or not. We agree with the President that the cost of borrowed money is too high," says one industry executive.

One special area of optimism for the industry is an "increased awareness" on the part of manufacturing managers about the productivity improvements made possible by material handling systems when they're hooked up with state-of-the-art machinery.

Yet, while those companies in the AS/R end of the business are downright bullish about the rest of 1983, others in the industry have some questions. Recent closings of lift truck plants and some relocation of production "off-shore" have shook the industry to say the least.

"You don't, generally, worry about losing the systems business to Japan. There's an intimacy required in building a large project. And there's a service requirement that can't be handled off-shore. But lift trucks, racks perhaps, belting, and other conveyor parts? We do worry that some of that seems to be following other U.S. business across the Pacific," says an industry observer.

Industry sources also expect good business throughout 1983 due to replacement and maintenance needs in the AS/R business because so many of these systems are now in place. As the economy recovers, increased usage cannot but mean more orders for certain replaceable parts.

Appliances

Figures for the first half of 1983 should show shipments of major home appliances running at a modest 4 pct above 1982's pace. That figure, however, does not begin to tell the extent of growth of appliance shipments in recent months.

By May 1, shipments were up some 28 pct for dishwashers, 32 pct for disposers, 28 pct for electric ranges, 10 pct for refrigerators, 16 pct for microwave ovens, and 9 pct for home laundry equipment, when compared with year earlier levels. Most major appliances have shown seven straight months of increased shipments.

Air conditioner sales, however, have yet to recover from last year's disasterously cool summer and are dampening the industry's otherwise strong performance.

At first appliance sales grew because more houses were being built and sold. New housing starts traditionally account for about 20 pct of new appliance sales. Despite slipping somewhat in March and April, housing starts remain above 1982 totals.

Even if fewer homes are built, the resulting slack in appliance sales is being taken up by consumers looking for replacement appliances. Retail sales growth was non-existent during the first months of this year, but is slowly coming alive. Increases of 1.7 pct in March and 1.6 pct in April were posted.

If the recovery in retail spending should continue—and experts believe that if interest rates remain down, it will—appliance sales should continue to increase through the third and fourth quarters.

If consumer spending continues to gain momentum through the third quarter, the number of appliances shipped for all of 1983 could well be 8 pct or 9 pct above last year's totals. A hot summer could also help air conditioners make a comeback.

Oil Country

With the recent pickup in drilling activity, there appears to be some optimism returning to the oil country tubular goods (OCTG) industry. But, added one oilfield executive, "it is a restrained optimism."

Rig activity hit its low for the year in mid-April (1,807 rigs), but it has been on a steady increase since then. In mid-June, 1,986 rigs were making hole in the U.S.

"What we are seeing here is a little bit of an upturn, but it's nothing real strong. I don't expect that to happen until August. By then we should see a strong pickup which should last throughout the rest of the year," the oilfield official said.

His optimism remains guarded, however, because of the surplus natural gas market which has greatly reduced the demand for deep drilling.

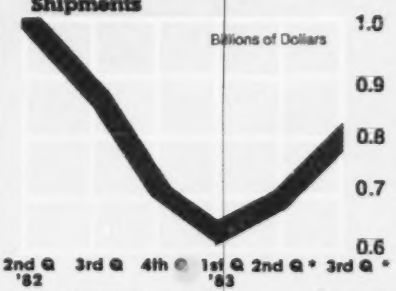
Nevertheless, he is encouraged. He and others believe that major oil companies will start spending more on onshore drilling now that most major offshore lease sales are over.

What does all this mean for OCTG manufacturers and distributors in the third quarter? Not much. There is still too much OCTG inventory on the ground—enough to meet the needs of the oil and gas industry through 1983.

"There's still close to 4 million tons on the ground," remarked a purchasing manager for a major oil company. "It'll be the end of 1983 before a lot of this is worked off. And, the problem is there will still be a lot of that inventory here (even then), because there's going to be a lot of high-strength and alloy material on the ground."

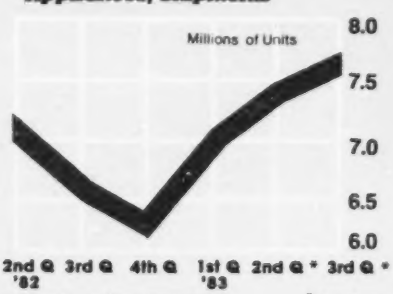
Because of the high level of inventory, the purchasing manager noted that he is now buying pipe, casing and tubulars on a well-to-well basis instead of a quarter in advance. He is also buying most of his OCTG products from other oil companies and distributors.

Material Handling, Shipments



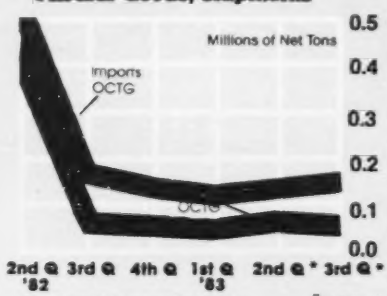
Source: Material Handling Institute *IA Estimate

Appliances, Shipments



Source: Assn. of Home Appliance Mfgrs. * IA Estimate

Tubular Goods, Shipments



Source: American Iron and Steel Institute *IA Estimate

QUARTERLY FORECAST

Castings

Auto oriented foundries have contributed heavily to the gains in gray and ductile iron castings in the second quarter. They'll also do a pretty strong business right through the third quarter, if present plans hold. Some jobbers supplying auto plants with castings, were still raising production in late June.

But the real surprises in the foundry industry's markets is waiting in the fourth quarter. At that time, auto-related castings business should drop off, at least seasonally. But that period could also see the long-waited revival of orders from the construction machinery and farm equipment industries—two important users of heavy castings.

Both these groups begin manufacturing in the fourth quarter for the 1984 spring season. Both are low on castings inventories. Both have closed down some captive foundries that used to meet part of their needs.

The current activity in some auto suppliers foundries, and the very slow tempo in the heavy (capital goods) casting markets, makes for an unprecedented range in the activity in foundry shops. While heavy castings producers labor at 30 to 50 pct of capacity, a few high-output, auto-related job shops are running full on a five day week and are planning Saturday shifts. A few are considering bringing on more melt equipment.

Ductile markets are moving up faster than gray iron. Aluminum foundries have also begun to discuss some new equipment orders with machinery suppliers, though both aluminum and copper-based castings have shown some order softness since late May.

But in heavy ferrous castings, for the first time in a number of quarters, some castings producers think they might make as much tonnage in the fourth quarter as they did in the third.

Forgings

With signs of recovery all around, the forging industry is still waiting for some of that new business to come its way.

There were few signs of recovery through the first half of 1983. And most industry officials see little reason to expect more orders in the third quarter, especially since that period is traditionally slow for the industry.

The chief hope for the quarter is that the rebounding economy will help cushion the usual summer slump. Some officials feel that business will pick up slightly in the fourth quarter because recovery for forge shops usually lags behind the rest of the economy by some six months.

Despite the slowly improving economy, many of the largest buyers of forgings are showing little signs of increased business. The aircraft industry, which gives impression die forge shops almost 42 pct of their business, remains depressed. Commercial aircraft sales are not expected to pick up significantly until 1984.

Farm and off-highway equipment, which accounts for about 11 pct of the impression die forgings' market, remains in a depressed state. The farming equipment market, in particular, will remain weak through the rest of the year. If the housing boom continues, eventually construction companies will work their way through the large amount of machinery left over from the last housing boom and recent company closings—but not yet.

Forgings for the oil field market (which account for about 5 pct of forge shop business) continue to worsen as the oil field industry remains engulfed in excess inventory.

Through April 1983, impression die forging shipments were down 30 pct from a year ago and orders are down 6 pct from a bad 1982. Open die forgers are doing even worse. Orders as of May 1 were down 44 pct.

Heat Treating

Heat processors and heat treaters show signs of hope on the one hand and a degree of uncertainty on the other.

There's a general overtone that recovery is coming—although slowly—but orders for heat processing equipment and billings by commercial heat treaters don't seem to reflect what the industry is hearing from Washington.

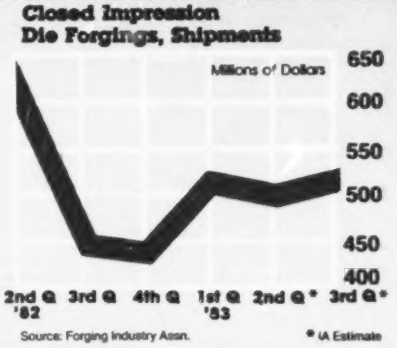
Even the statistics are sending mixed smoke signals. Final figures for industrial heat processing equipment for the first quarter showed good gains in domestic orders over the third and fourth quarters of 1982. However, as encouraging as these gains may be, the first quarter 1983 figures were still about 38 pct below the level of the same period in 1982.

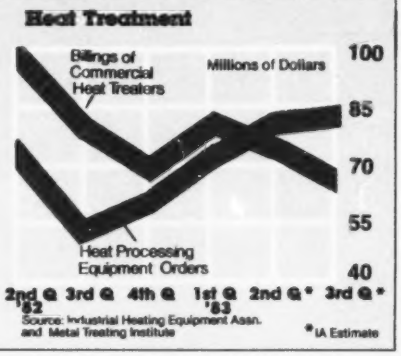
The pattern of activity, or lack of it, is similar among the commercial heat treaters. Billings improved in the first quarter of 1983 over those of the third and fourth quarters of 1982. But again, first quarter billings were more than 26 pct below those of 1982.

With both the equipment builders and heat treaters, there are spotty signs of encouragement. Domestic orders among some builders are picking up, but the general industry trend must still be viewed with caution. Heat treaters, too, can share some optimism.

Another sign of encouragement for heat treaters is that it's an industry that lags the general economy by anywhere from three to six months. With the improvements in industries such as autos, housing and others, heat treaters feel that their share will follow soon.

Builders of industrial heating equipment are beginning to see some signs of improvement in domestic orders among some companies. Overall, they're still predicting that 1983 will end with a slight improvement over 1982.





QUARTERLY FORECAST

Aircraft

The commercial aircraft industry is showing slight improvement from extremely weak levels of the past year, but the overall upsurge still is far less than the economy as a whole and is likely to remain so for the remainder of the year.

Not only are new sales minimal, but used aircraft clutter the market. The situation is further complicated by the novel lease arrangements affecting the industry and the other unique tactics being used by manufacturers to bolster paltry sales.

The latest ripple in the competitive fray involves agreements by airframe manufacturers to accept trade-ins of used aircraft to sell new ones. New orders for the second quarter are up strongly over last year. But in some cases both Seattle-based Boeing and California-based Douglas Aircraft (a subsidiary of McDonnell Douglas) accepted used aircraft in trade.

For example, Boeing placed with customers an average of 11 used aircraft annually during the past several years. In 1983 that figure is expected to triple or quadruple. Some of the planes are sold; others are leased out. The airframe manufacturers contend such tactics allow major airlines to make a profit through unloading inefficient equipment. But another effect is a further glut of the used market.

Both Boeing and Douglas foresee long-term promise in the aircraft industry by the 1990s. But the near-term outlook is bleaker. One industry executive notes that the financial problems of the world's major airlines continue to adversely impact the current market. Unfavorable global economic conditions have resulted in poor profit growth and profitability for the airlines. They are left with excess capacity in certain models of aircraft and insufficient earnings to purchase the new, more efficient airplanes.

Engines & Turbines

The engines and turbines industry has yet to accelerate along with the rest of the economy. Most companies are holding to the forecast that business won't increase noticeably until 1984.

The problem is that customers' business was so far down that it will be quite awhile before they need to buy new equipment.

The consensus is that 1983 will be flat compared to 1982. There is a continuation of big project delays, as few "are progressing past the advanced study stage," according to a source.

Another problem is pricing. Total volume in 1983 may turn out to be the same as 1982, but profits will be down because of soft prices.

Those selling the construction equipment market are complaining the loudest, in spite of the building industry's renewed activity. The tremendous inventory overhang at the manufacturers' and distributors' levels must be absorbed before new orders will affect engine production rates.

The air compression market is not expected to pop until factory operating rates reach more normal levels.

Surprisingly, some manufacturers have the most confidence in an agriculture market pickup. "We expect the payment-in-kind (PIK) program will convince farmers to spend some money on equipment. Then maybe we'll see some orders," says an analyst.

As for the high-ticket end of the industry, the picture is still bleak. With the power generation market so weak, the outlook for turbine generator sets is not good for the short or long term.

An executive sums up his company's forecast: "We don't anticipate business in general to improve that much until the second half of next year. We're looking for some increases before then, but it will probably mean that this year is roughly the same as last year."

Welding

A recovery is under way in welding, but it is certainly nothing to write home about.

From the looks of things, business picked up slightly during the first quarter of 1983, the fourth quarter of 1982 being "the pits," so to speak. This year's second quarter is a little better than the first quarter and the upcoming third quarter should improve a bit as well.

The two industries that could really turn welding around—defense and energy—are still in the "pie in the sky" phase.

Internationally, some say, the welding climate is much worse than it is in this country.

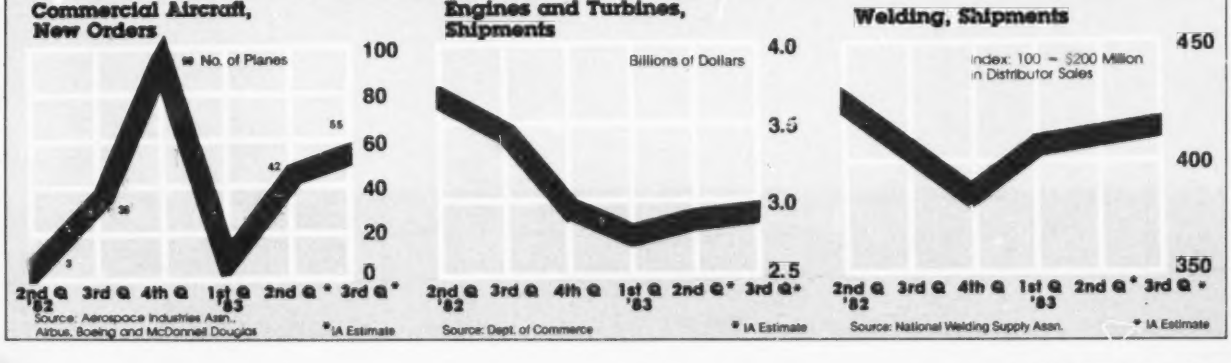
Based on the statistics published by the National Welding Supply Association (NWSA), Philadelphia, December 1982 was the worst month (an index of 118.7) since the February 1979 index of 118.0

The index moved up to 126.0 in January, 131.8 in February, 150.2 in March and 142.8 in April. The March index, incidentally, was the best since November 1981.

According to some of the major welding manufacturers, such consumables as electrodes and shielding gases have been improving, slowly but steadily. The problem is welding equipment.

"Before the recession hit," explains one executive, "a lot of factories were geared up to handle the demand of the 1979-1981 period. Much of this welding equipment is now sitting around idle. It will be some time before we experience another boom in welding equipment," he predicts.

The evidence of sales fluctuations in the NWSA statistics prompts one welding distributor to note: "This irregular pattern is typical of the way a recovery gets moving and in no way reflects doubts about business activities."



QUARTERLY FORECAST

Fasteners

The issue in the U.S. mechanical fastener industry has been *the* issue for years and it's still *the* issue: imports. "Yes, the recovery is underway. No, we're not recovering," says a mechanical fastener industry expert.

Talking about the recovery in the mechanical fastener business is like talking about sex in church. It's interesting, but other issues have priority. Without some kind of relief from imports, plant closings will continue until the market is almost entirely foreign except for some of the "specials" manufacturers.

Meanwhile, many companies agree that order rates are picking up and a recovery is underway. The pick up, however, is not major, sources tell *Iron Age*. They attribute that largely to the increased share of market on the part of Pacific Basin economies.

Still some hope comes from the American military buildup. A tank, for example, contains thousands of mechanical fasteners. "We expect to share in that business, but not like we would have before so much was lost to off-shore producers," says an Ohio manufacturer.

Others in the industry predict more plant closings as the domestic market continues to fall to foreign competition. "It's inevitable," says an industry analyst.

Specials makers have, so far, been able to maintain market share and expect '83 to be significantly better than '82, a year of record lows. "We expect to see a continuing rise in our orders, perhaps as much as 25 or 30 pct above '82 for all of '83," says one.

Still, outside of engineered products, the industry as a whole cannot talk about recovery while it's worried about survival.

And, increasingly its thrust has been towards lobbying in Washington and throughout the country for relief of some kind.

Screw Machine Products

The screw machine products industry, with a very discouraging 1982 behind them, finally has some reason for optimism. The first quarter of 1983 was unexpectedly strong and the second quarter apparently is up slightly from the first quarter.

"The industry may finally have turned the corner," remarks one industry observer. "Going into the second quarter, orders were running about 15 pct above last year's totals."

After the first quarter, there was some backsliding as orders dropped off, but the second quarter should end on an upswing.

Despite improvements this year, manufacturers remain cautious and believe the road to recovery will be slow and rocky. "It looks like relatively slow growth from now on, but we will probably see nothing substantial until the end of the year, and maybe not even then," comments one industry executive.

The biggest reason for this guarded optimism is the gradual improvement in automotive sales. Close to one-third of all screw machine product sales go to that industry. The sustained growth of the appliance industry through the first two quarters and the pick up of housing starts is also helping the industry. Some 6 pct of screw machine products go into household appliances.

However, other areas served by the industry remain mired in the recession. The commercial aircraft industry remains depressed and will not pick up this year. Machine tool, machinery, and farm construction equipment sales continue to be down.

Through the rest of this year industry growth will be gradual, but uneven. Just as sales at the beginning of the second quarter dipped slightly after four months of growth, business for the rest of the year will have its ups and downs.

Stampings

The stamping industry is slowly coming back to life, with shipments expected to rise gradually and order books firming through the third quarter.

Bookings are increasing more sharply than are shipments. The strength appears to be broadly based, with manufacturers tied to the housing and automotive markets showing the most improvement.

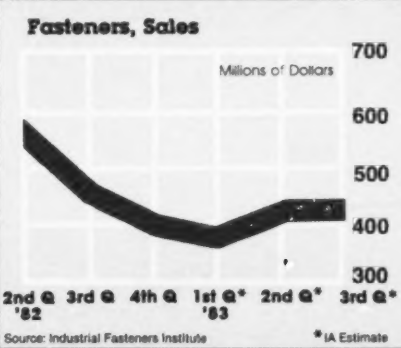
"Automotive is scheduling now for a few months ahead, instead of just one. I guess now they expect to be in business three months from now," one stamper says wryly. "Business has been pretty steady and we expect to be busy in the summer and fall," he adds.

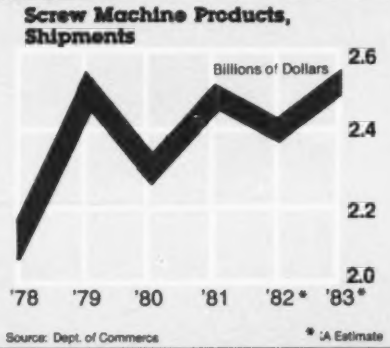
Another says his company is managing to show a profit for the first time since early 1980. He says the "economy's on an uptick," but isn't yet steamrolling.

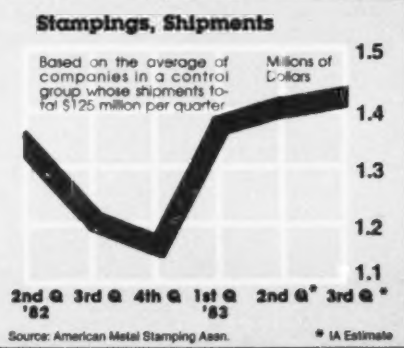
"Everything's relative. We're calling some people back, but when you've got 20 laid off and call two back, you're not setting the world on fire." Nevertheless, he adds, order books for his transportation-tied business look healthy through the third quarter.

A stamper in the plumbing market says right now he can't keep up with all the orders. "It's a much better set of headaches," he hastens to add. This West Coast manufacturer attributes the sharp increase to pressure from wholesalers and suppliers facing a 15-30 pct jump in housing starts and no inventory to meet it.

The cheer from stampers is tempered by some concerns expressed by many. First, the looming Federal deficit may set interest rates and inflation spiralling again, stifling the recovery. Second, the large overhang of used machinery on the market will cause a drag on the recovery of the capital goods market and therefore, on the economy as a whole.







QUARTERLY FORECAST

Bearings

For the antifriction bearing industry, the third quarter brings some good news and some bad news. The good news is that the biggest buyer of bearings, the automotive industry, is beginning to purchase more bearings. The bad news is that nearly every other major user of bearings has yet to pull itself out of the recession.

The rebound in the automotive industry and in aftermarket sales should permit industry growth of several percentage points in the third quarter. Some 30 pct of the ball and roller bearings market is directed at motor vehicles and parts, so even a modest jump in car sales is good news. The appliance industry is doing even better than automotive companies, but only a trickle of bearings go into appliances.

Major capital equipment expenditures are not yet being made despite some recovery by many industries. The construction industry, which accounts for 9 pct of bearings sales, remains depressed. Farm machinery and general industrial machinery also remain down. Other major users of bearings, such as the machine tools industry and mining and oilfield operations, are depressed.

Aftermarket sales remain steady, but intense competition by several firms that are seeking to increase market share, is eating into profits. As companies get back on their feet, bearing industry officials see growth in the aftermarket, as companies replacing old bearings on idle machinery that will be brought in production.

"The aftermarket has been our savior," says one company spokesman. "Without it we would have gone under long ago. We see it picking up in the third quarter. We don't serve the automotive market, but through the second quarter, we have not seen any pickup in orders from our OEM customers."

Valves

Most valve makers have written off 1983, expecting no significant pickup until into 1984.

The dollar forecast for shipments for the year is somewhat deceptive as it is calculated in current dollars. It also does not reflect the steady erosion by imports of domestic unit sales of the lower-dollar, higher-volume commodity end of the market.

As one PVF (pipe valves and fittings) producer points out, "Fifty to 60 pct of valve usage is energy-related, and those markets are flat on their backs. Until they start moving and distributors anticipate it by restocking, there will be no impact on the manufacturer."

He adds that the combination of large inventories and low demand will continue to drag on the industry.

Others are seeing some positive signs, however. "We're still behind last year in shipments to date," says one company analyst, "but we're building toward improvement." His company is even increasing inventories 25 pct in anticipation. "We want to be in position to meet the demand for fast shipment," he explains.

The municipal market is experiencing a bit of an upturn as a result of the interest rate decline. One Eastern company finds that the water market is best, followed by power generation.

This company's orders are up, prompting employee callbacks because of accelerated delivery requirements.

The petroleum market is still limping along and most expect it to lag the recovery of other energy and industrial markets.

In general, cautions one executive, "Inventory liquidation is still going at full pace by the distributors. Prices are still soft and there's no disposition to restock. Until that changes, there will be no appreciable recovery for the manufacturers."

Gears

The gear industry is limping along, with a recovery expected in 1984.

Most industry executives agree on the state of business today: "We're still on the bottom," says one. "The great industrial heartland is still crawling along the bottom, waiting for Godot," remarks another.

Still, most feel business has hit bottom and will only improve; the question is how soon. Since the gear industry tends to lag the general economy by six to nine months, few expect any significant strength this year.

"We have to see the capital goods market pick up before we pick up," is the forecast from a Midwest company. "We need a stronger pickup to impact the capital goods sector and work its way down to us."

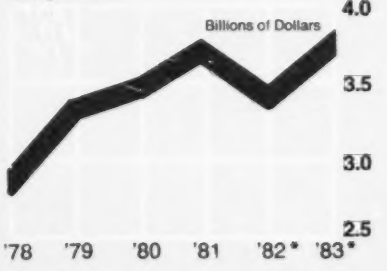
Some markets look brighter than others. Steel is ordering a bit more for repair and "mini-expansions," especially from sheet mills serving automotive. Defense aerospace is holding its own. Some report paper and pulp to be fairly steady. Also, construction is seeing some activity.

The weaker markets include mining and agriculture equipment, water transportation and energy. Machine tools are hurting from "too much foreign competition and so much used equipment on the market from companies who've gone belly-up," laments one executive. Cement is "a big question mark," according to a major gear producer. "It could go boom or bust," he says.

Overall, most report new quote activity is still spotty and order books are not likely to improve much this year. Lead times continue to be short.

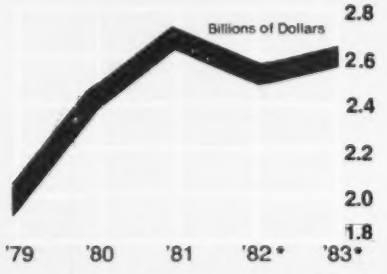
"Customer did not respond to signals of stockouts," says an Eastern manufacturer. "When they finally decide to order, they want it fast. There's a strong reaction to real need and none to perceived need."

Antifriction Bearings, Shipments



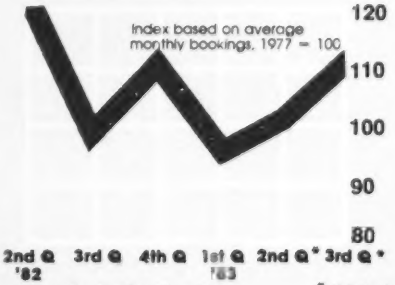
Source: Dept. of Commerce * IA Estimate

Valves, Shipments



Source: Value Mfgrs. Assn. * IA Estimate

Gears, Bookings



Source: American Gear Mfgrs. Assn. * IA Estimate

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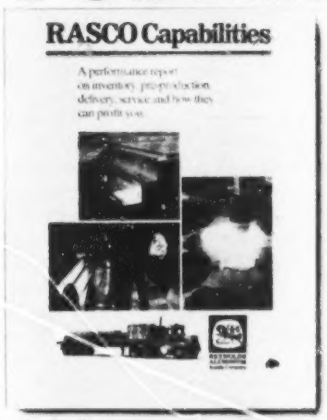

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QUARTERLY FORECAST

Shipbuilding

The last major bulwark supporting the U.S. shipbuilding industry is losing some of its strength.

With merchant shipbuilding at a virtual standstill, the major rebuilding of our Navy had been counted on strongly. Now it appears that the planned five-year program is going to be trimmed.

Recently, the Secretary of the Navy announced that the plan, originally pegged to spend $28 billion by 1988, looks as though it will have to be scaled down to a range of between $10 billion and $13 billion annually. The reason: "Severe budgetary pressures."

Commenting on this the Shipbuilders Council of America said, "This development implies that the Fiscal Year (FY) '84 to FY '88 Naval shipbuilding program could be considerably less than 124 newbuildings. Principal reductions would affect 'out-years.' Previously, 28 ships each were planned for FY '86 and FY '87 and 30 ships for FY '88."

Add to that this kicker. About six weeks earlier the Navy Secretary declared, "There is not enough Navy business to hold the shipbuilding base, and more companies are going to go out of business. We need more of a base than we are going to be able to hold onto with purely Navy building."

Government maritime officials indicated (in May) that only one new ship, a chemical tanker, had been ordered since last November. And there was a prospect that another new one, a dredge, might be ordered this spring.

The chairman of one of the largest and most successful shipbuilding companies has gone on record as saying the Reagan Administration's present maritime policy "will shatter the U.S. shipyards industry; only a limited number of yards will remain to support the Navy's construction and repair needs."

Rail Cars

The new order outlook for freight cars and other railroad equipment remains bleak. There are a few plus signs, but many more negative ones.

On the plus side: Freight cars now in storage have decreased about 10 pct from the almost 300,000 stored at year-end 1982. (Needless to say, this is hardly a strong positive factor.)

Freight car buying and trackwork activity should follow railroad freight business, with a turnaround by late 1983 or early in 1984. This assumes that freight traffic and carloadings will follow a general economic pickup in the second half of 1983.

That's the limited good news. Now here are the negative signs:

The large overhang of surplus freight cars, coupled with weak traffic levels will further depress freight car building activity to levels not seen since the Depression of the 1930s.

Without a sharp rebound in traffic, trackwork maintenance programs will almost equal 1982's weak level.

The present decline in rail traffic, railroad mergers, increased hauling efficiency and the rising use of piggybacks all account for less freight car demand.

With industry backlogs virtually non-existent, even if freight car orders should double this year (an unlikely prospect), shipments will remain substantially below last year's level.

Latest word from the American Railway Car Institute (ARCI) underscores this anemic backlog. As of May 1, the backlog of cars on order and undelivered was 4,326, compared with 10,942 on May 1, 1982.

ARCI says new orders placed this April numbered 615. □

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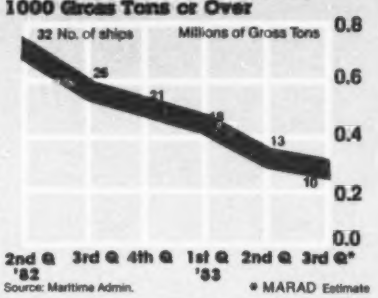
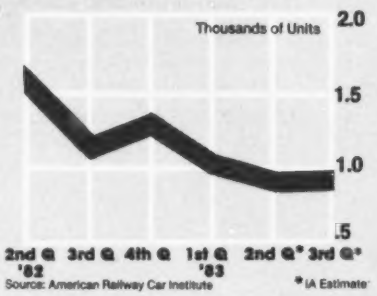
Shipbuilding, Commercial Ships on Order or Under Construction, 1000 Gross Tons or Over



Source: Maritime Admin. * MARAD Estimate

Rail Car, Orders



Source: American Railway Car Institute * IA Estimate

LASERS: A REVOLUTIONARY TOOL IN THE MANUFACTURING ENVIRONMENT

Once just a curiosity, lasers are entering metalworking's mainstream as barriers to laser acceptance by industry continue to fall.

BY ROBERT E. HARVEY

Like "a loud silence" or "a fiery cold," "a metalworking laser" is an oxymoron, an incongruous union of terms. Rolled-up, dirty blue sleeves, down-to-earth inventiveness and practicality, and concerns over day-to-day production characterize the metalworking industry.

Lasers, on the other hand, have always been veiled in the exotic: Witness President Reagan's recent proposal to develop killer satellites armed with laser cannons. Think of lasers and the picture that comes to mind is scientists in white coats tinkering with some equipment out of "Star Wars."

Never mind that lasers can be an effective metalworking tool; their sales are hurt because of an image problem. A laser has difficulty proving to the shop floor that it's just another tool.

The image problem, created in part by the laser manufacturers themselves, is one of a host of major and minor problems that have held up what many considered a natural marriage between lasers and industry. However, without much fanfare many of these obstacles have been or will soon be overcome.

A number of experts believe that the courtship of the laser by the metalworking industry will now begin in earnest. That is not to say that industry is just discovering the laser. Some 5,000 are in operation today, but most of those service only the electronics and microelectronics industry (see table).

"I think right now is perhaps the beginning of the period of growth the laser industry has envisioned for years," says David A. Belforte, president, Belforte Associates, Sturbridge, Mass., consultants on industrial lasers. "There has been a lot of promise that has not been fulfilled, but I think that a number of circumstances have come together at the same time which makes the potential for the penetration of the laser into manufacturing very attractive now."

In general, these changing circumstances involve changes in attitude, changes in hardware, changes in cost, and a growing library of laser manufacturing data.

A laser has a number of properties, but for metalworking purposes, it need be thought of only as a source of intense, finely focused heat. This scalpel of light principally is used for cutting, welding, heat treating and etching operations. Its high-energy, narrow-beam properties allow it to heat rapidly, then quickly move on. Operations are exact and metal surrounding the work area is unaffected by the sudden heat.

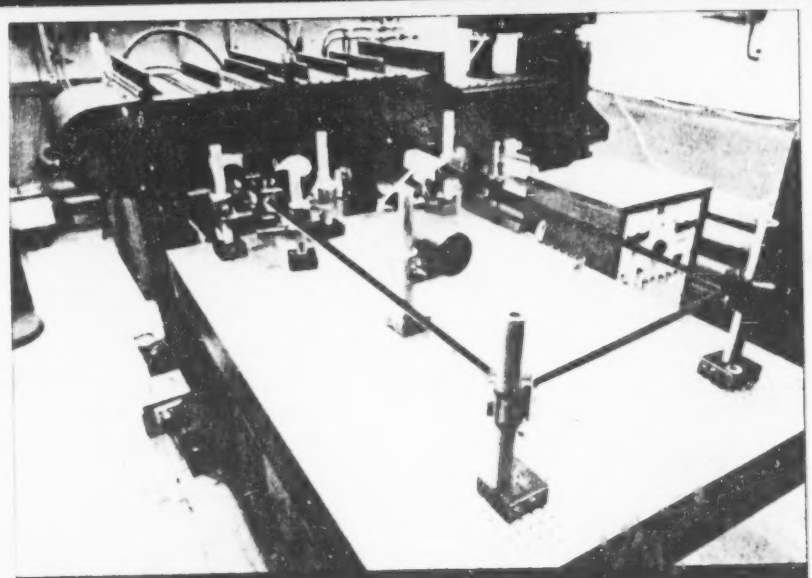
"All the processes with the laser need very little cleanup, so you often can remove a step from the manufacturing process," comments one laser operator. "By heat treating with a laser, you can eliminate some straightening and grinding operations."

Since the laser is only a beam of light, it can be manipulated with a mirror. This ability to easily alter the beam's path makes the laser very flexible. In metalworking, for example, ordinarily the workpiece must be brought to the machine tool. A laser beam, however, can go to the workpiece. In addition, by splitting the beam, a laser can do a number of operations at the same time. Paradoxically, this very flexibility has hindered the acceptance of the laser as a metalworking tool.

"Everyone in the laser business ran around for years talking about flexibility and they didn't realize that that was the last thing in the world that many people wanted," explains Mr. Belforte. "What they wanted was a dedicated machine that produced parts at the lowest price."

Without expert laser operators, firms that buy lasers primarily for flexibility are asking for trouble. "The laser seems to work best when you set it up for a single process and let it run 24 hours a day with some occasional downtime," says Mark Baldwin, general manager, Iowa Laser Technology, a laser-operating job shop in Cedar Falls, Iowa. "My feeling is that firms need considerable expertise to change from one process to another."

Mr. Baldwin also stresses that equipment alterations needed to change from one process to another can be expensive. "The laser often comes with some sort of secondary tooling that is specifically designed for one operation. If the manufacturer is going to change a part size or a process, he may end up spending $100,000 for retooling."



LASER USAGE IN THE UNITED STATES BY INDUSTRY

SIC	Manufacturing Category	Number of Lasers Under 100 W*	100-999 W	Over 999 kW**
211	Cigarettes	—	60	—
232	Men's & women's suits	—	13	—
265	Cardboard boxes	—	25	—
2834	Pharmaceutical products	3	—	—
3041	Plastic hose	—	5	—
3069	Fabricated rubber products	—	2	—
3231	Products made of glass	17	17	3
3489	Ordnance & accessories	—	—	2
3511	Turbines	—	8	5
3523	Farm machinery & equipment	—	10	—
3551	Food products machinery	3	—	—
3561	Pumps & pumping equipment	—	—	3
3661	Telephone equipment	45	—	—
3573	Computer peripherals	34	22	1
3841	Heart assist devices	—	14	—
3769	Aerospace	—	—	1
3721	Aircraft	30	2	2
3951	Pens, mechanical pencils & parts	—	2	—
3432	Heat exchanger	—	—	1
3585	Air conditioning (auto)	—	—	10
3873	Watches, clocks & parts	10	—	—
3851	Ophthalmic goods	2	—	—
3621	Electric motors	1	1	2
3559	Appliances	1	2	3
3674	Semiconductors	1500	400	—
3679	Hybrid electronics	2000	—	—
3691	Storage batteries	—	5	2
3713	Truck & bus bodies	—	—	1
3714	Motor vehicle parts & accessories	11	3	40
3743	Railroad equipment	—	—	4
3842	Surgical appliances & supplies	5	—	—
3843	Dental equipment	—	3	—
	Totals:	**3662**	**594**	**80**

Source: ITT Research Institute
* Watt
** Kilowatt

"Sometimes a buyer is told that this laser is going to cut, weld and heat treat, but he is not really shown that it takes different accessories and different expertise to let him do these things," reports Mr. Baldwin.

Rather than selling the laser as an exotic tool that can do anything, laser manufacturers are developing systems that are more dedicated, more rugged, and more able to compete effectively with other processes on the production line.

"The laser industry has finally responded to the needs and wants of the user by getting away from the laser itself and promoting the laser as a solution to a manufacturing problem," relates Mr. Belforte. "People can now purchase a laser machine tool, if you will. You can now buy a processing system and the fact that it happens to be a laser is really inconsequential."

What is important is that a manufacturer now can produce a part at a lower price, not that he is using a laser. The laser industry is no longer selling lasers just because of their unique characteristics or for their ability to tackle unique jobs. They are being sold on their ability to be cost-effective with other processes. But to challenge the conventional machine tools on their own turf, lasers had to be designed to handle the rough and tumble of the shop floor.

"One of the major reasons why lasers are looking more attractive to the manufacturer is that laser manufacturers have begun developing rugged, reliable, industrialized equipment," explains Mr. Belforte. "The industry for years gave lip service to this need and it has only been in the past four or five years that they have begun responding to the needs and demands of the user and put into these systems the ability to operate in the factory and run for long periods of time."

While the emphasis is on adapting the laser to the factory, manufacturers have not given up trying to harness the laser's flexibility. "Particularly with our YAG laser, flexibility is one of its major advantages," says a spokesman for Control Laser Corp., Orlando, Fla. "We can weld, drill, cut, anneal and heat treat with the same laser by changing the beam characteristics. That is where our computer, which we developed to optimize the performance, is invaluable. You can put in a new program and go from welding to drilling, cutting or whatever and that you cannot do with conventional equipment."

Lasers are increasingly taking on the look and duties of machine tools. These lasers are showing up on transfer lines, in batch manufacturing operations, as

stand-alone machines in places like job shops, and as machines working in tandem with other machines.

A laser from Coherent, Inc., Palo Alto, Calif., for example, has found its way into what is apparently the first fully automatic in-line transfer-type drilling machine. The system has been installed in an automobile engine plant in Australia.

Systems called laser machining centers, which cut and drill on commands from computer controls, are showing up in increasing quantities. Coherent has one which uses Fanuc controls that permits digitizing or programming the three axes of motion. Raytheon Co., Waltham, Mass., also has a machining center, as does Control Laser and others.

Besides operating alone, lasers are working in union with conventional machine tools. The first U.S. machine-laser combination was produced by the Strippit Division of Houdaille Industries. In 1978 CNC turret punch-press was married to a high-power CO_2 laser. Since then, other manufacturers such as C. Behrens Machinery Co., Inc., Trumpf America, Inc., the Wiedemann Div. of Warner & Swasey Co. W. A. Whitney Corp., U.S. Amada Ltd., and Raskin, SA have developed tandem operations.

Not all the joint operations involve punching and cutting sheet metal. The Omni-Lase 2001 from Photon Sources, Inc., Livonia, Mich. is used in combination with a Bridgeport three-axis CNC milling machine. Reportedly the unit can mill, bore, drill, cut, weld, surface harden, scribe and pierce a wide range of materials. The Bendix Industrial Group has developed a system that combines a turning machine and laser.

Laser Capabilities

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Source: IIT Research Institute

The laser is highly amenable to flexible automation and can be integrated into at total manufacturing system.

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HI-TECH REPORT

(Cont. from p. 51)

After the workpiece is machined, it is then surface-hardened by the laser.

As laser manufacturers listen more intently to what manufacturers want and need, barriers that have kept lasers from the factory are being removed. Probably the biggest obstacle to increased laser usage, however, is their high price. But even this barrier is being reduced. Firms are beginning to recognize the need for increased automation and higher productivity. A laser fits in well with increased automation. It is easily computerized and responds rapidly to signals.

"Companies are recognizing that if they don't find a better way of doing things they are not going to survive. And the laser despite its high price is often that better way," says one industry official.

Firms are starting to spend money now because they know that they will need that laser in order to remain competitive somewhere downstream.

Also, the cost of lasers are not going up with inflation and in some instances prices are coming down. "I know where a couple of new 600w CO_2 lasers are now selling for around $50,000. That was the price we used to pay for 350w lasers 12 years ago," reports Mr. Belforte.

Despite holding the line on prices, companies have to be very careful that the laser they buy will soon pay for itself.

"From a cost standpoint, a company that doesn't have the expertise in operating lasers would be best off looking for that particular application that will make use of the laser full time," explains Mr. Baldwin. "Everything else would be best farmed out to a job shop. I look at it sort of like the time-sharing approach of computers 15 years ago. Then they were just too expensive and too dependent on skilled personnel to operate. Time sharing was a necessity. Any machine that costs $250,000 has the potential for time-sharing."

As time goes on, however, lasers will become more affordable. "In the near future I think we will see some cost reductions," reports Frederic D. Seaman, science advisor, IIT Research Institute, Chicago. "The main driver for these reductions is going to be volume production." As more barriers go down and more companies buy lasers, prices will drop.

And speaking of low prices, the Japanese are preparing to market lasers in the U.S. This move certainly will have an effect on prices, although at present Japanese lasers sell at prices comparable to those in the U.S.

According to Mr. Seaman, the major push by the Japanese is not expected for a few years yet, primarily because the Japanese have not yet developed a strong home market for lasers. Nevertheless, laser development is one of the fields that the Japanese government has singled out as having high growth potential. A lot of research money is being spent on development.

Another problem that has slowed laser acceptance has been the lack of operating standards and documentation, especially in the area of heat treating and, to a lesser extent, in welding.

"In case hardening, there is a dearth of research," says Mr. Baldwin. "There are a lot of people using it, but I'm not convinced that they all understand what is going on metallurgically."

Parameters on laser cutting and drilling are for the most part available; welding statistics are coming in, but ad-

Classification of Industrial Lasers

Lasers for manufacturing are typically divided into a light class (several to several hundred watts) and a heavy class (one to twenty kilowatts). Another way to categorize lasers follows:

Category One, under 100 watts: This group is principally made up of the lower power continuous wave, yttrium aluminum garnet (YAG) type of neodynmium (Nd) solid-state laser, pulsed at rapid rates using and electro-optical device called a Q switch. It is particularly adapted to the microelectronics industry.

Category Two, 100-999 watts: Lasers in this group are of the pulsed power supply type. CO_2 and solid-state technologies compete for many applications. (Competitors include the ruby, Nd glass, Nd YAG, and CO_2 lasers.) The active commercial range at present is from 100 to 500 watts.

Category Three, over 999 watts: The lasers in this group are often called multi-kilowatt. They are all based on CO_2 technology and operate in the continuous wave mode.

Source: IIT Research Institute

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equate statistics on heat treating are still a little ways off.

From the laser manufacturer's point of view, a major barrier to improved sales is lack of information by people in industry. "I personally believe that the biggest reason hindering sales to industry is probably the lack of knowledge of people of what the laser can do," explains James Johnson, production manager, solid state, Control Laser Corp. "I think that people still think that the laser has to compete with existing machine tool processes. If they knew the capacity of the laser, then they could take advantage of its processing characteristics when they are designing their process."

Although the laser must compete with other equipment in the factory, it is unwise to begin comparing a laser head-to-head with another specific machine.

Often the justification for purchasing a laser is not how it compares with another machine, but how it affects the entire manufacturing system.

"You don't just rip something off the line and slam a laser in its place and necessarily expect it to be cost effective," reports Mr. Seaman. "The elimination of secondary operations is the biggest justification for a laser."

One barrier to laser acceptance really isn't a barrier. A number of people remark that the high energy usage of the laser makes it unacceptable. In reality, lasers are as energy efficient as other production equipment.

"Research has shown that as a general rule when you compare a laser's energy consumption with other processes, you will always win in welding and you will always lose in cutting. But the amounts of energy used in cutting are so small, why worry? In heat treating, where a lot of energy is used, you can win or lose depending on the amount of engineering you do to decide where you are going to harden the part," says Mr. Seaman. "If you want to make the part look exactly like a carburized or induction-heated part, then you lose, but only slightly."

Despite some dissent from people who see little growth in the heat-treating industry in the next few years, a number of people see the biggest sales of lasers going for heat-treating applications.

Mr. Baldwin, for example, sees case hardening as "a major frontier for the industry." Mr. Seaman has a similar vision as does an official from Photon Sources. Continued growth also is expected in combining lasers with machine tools so they become "an intregal part of the machine tool itself." This packaging has already begun, but tomorrow's systems will find lasers linked to multiple machine tools, tools arranged into some sort of manufacturing cell.

According to Mr. Seaman, flexible manufacturing systems (FMS) hold the most potential for dealing with batch manufacturing, which accounts for 80 pct of U.S. manufacturing. "However, the benefits of FMS are presently attainable in only one class of manufacturing operations—machining," he says, adding that if the benefits of flexible automation are to have a wide range of forming, machining, surface treating and assembly operations, a laser must be employed in the process.

While flexibility might be a goal for future laser development, ruggedness, durability and simplicity are important goals for today. □

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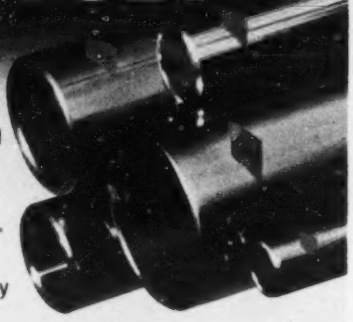

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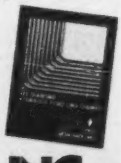

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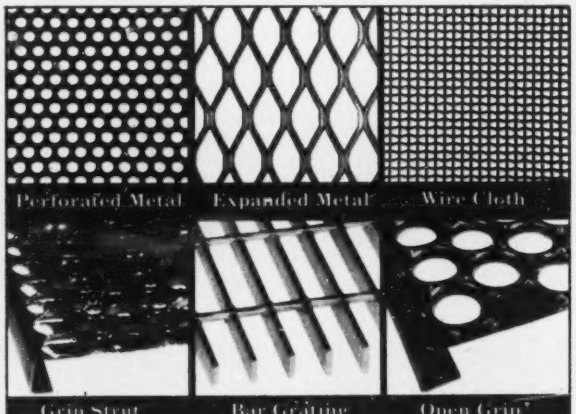

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MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	203	210	185	165
Buffalo	32	30	31	32
Pittsburgh	199	190	199	145
Youngstown	109	94	103	76
Cleveland	115	121	130	101
Detroit	134	129	133	118
Chicago	408	463	475	404
Cincinnati	97	95	89	73
St. Louis	74	67	72	35
Southern	137	136	130	139
Western	85	86	80	77
U.S. Production	1,593	1,621	1,627	1,365

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective June 20, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,593	1,621	37,231	38,899
Capability Utilization Rate	55.1	56.1	53.3	54.6

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.297
Pig Iron* * (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton = 2240 lbs.)	$ 70.83	$ 70.83	$ 70.50	$ 56.83
No. 2 bundles	$ 46.17	$ 46.50	$ 46.50	$ 43.17

Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 72.50	$ 72.50	$ 71.50	$ 61.50
No. 1 steel, Philadelphia	68.50	68.50	68.50	61.50
No. 1 steel, Chicago	71.50	71.50	71.50	53.50
No. 1 bundles, Detroit	71.50	71.50	69.50	52.50
Low Phos., Youngstown	75.50	75.50	71.50	66.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	76.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	103.50
No. 1 mach'y cast., Chi.	108.50	108.50	108.50	107.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective June 20, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	78.00	77.50-78.00	6/20/83
Lead	19.00-23.00	19.50-23.00	6/7/83
Magnesium Ingot	138.00	134.00-138.00	6/1/83
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	4/27/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $215.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.55-$1.70
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $415.75
Indium, dollars per troy oz. $3.50
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$295-$305
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $11.90
Vanadium $4.94
Zirconium sponge ..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

June 13—597.57
June 14—597.60
June 15—600.60
June 16—600.88
June 17—601.91

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	77⅛	68¼
Yellow brass	64½	61⅛
Red brass	70⅝	65⅝
Comm. bronze	72¾	67
Mang. bronze	64⅛	61¼
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	69
No. 2 copper wire	60
Light copper	51

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	65
No. 2 copper wire	56
Light copper	47
No. 1 composition	56
No. 1 comp. turnings	53
Hvy. yellow brass solids	37
Hvy. yellow brass turnings	29
Radiators	45

Aluminum

New mixed clips	42	—43
Old sheet	39	—40
Old cast	39	—40
Clean dry borings	39	—40

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	33	—34
Mixed L.C. clips	28	—29
Old sheets and cast	25	—26
Borings and turnings	17	—18
Duraluminum clippings	28	—29

Copper and Brass

No. 1 copper wire	61	—62
No. 2 copper wire	54	—55
Light copper	48	—49
Radiators	38	—39
No. 1 composition	48	—49
No. 1 composition turn'gs	45	—46
Cocks and faucets	34	—35
Clean heavy yellow brass	32	—33
Brass Pipe	33	—34
New soft brass clippings	48	—49

Lead

Heavy soft lead	9	—10
Whole batteries	3	— 4
Type metal	15	—16
Electrotype	14	—15

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	50	— 60

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

EFFECTIVE JUNE 20, 1983

MATERIALS NEWSFRONT

(Effective June 20, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	61.00 to	62.00
No. 1 dealer bundles	87.00 to	88.00
No. 1 factory bundles (auto)	87.00 to	88.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	86.00 to	87.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	26.00 to	27.00
Cast iron borings	25.00 to	26.00
Low phos. punchings plate	88.00 to	89.00
Heavy turnings	61.00 to	62.00
No. 1 RR hvy. melting	88.00 to	89.00
Rails 2 ft. and under	103.00 to	104.00
Scrap rails, random lgth.	88.00 to	89.00
RR specialties	94.00 to	95.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	590.00 to	600.00
18-8 turnings	490.00 to	500.00

Chicago

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	84.00 to	85.00
No. 1 factory bundles (auto)	85.00 to	86.00
No. 2 dealer bundles	44.00 to	45.00
No. 1 busheling	82.00 to	83.00
Shredder scrap	79.00 to	80.00
Machine shop turn.	17.00 to	18.00
Mixed bor. and turn.	18.00 to	19.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	39.00 to	40.00
Low phos. forge crop	89.00 to	90.00
Low phos. punchings plate ¼ in. and heavier	98.00 to	99.00
Low phos. 2 ft. and under	95.00 to	96.00
No. 1 RR hvy. melting	82.00 to	83.00
Scrap rails, random lgth.	79.00 to	80.00
Reroller rails	90.00 to	91.00
Rails, 2 ft. and under	94.00 to	95.00
RR couplers and knuckles	82.00 to	83.00
RR car axles	112.00 to	113.00
No. 1 machinery cast	108.00 to	109.00
Cupola cast	95.00 to	96.00
Stove plate	94.00 to	95.00
Steel car wheels	82.00 to	83.00
Stainless		
18-8 bundles and solids	560.00 to	570.00
18-8 turnings	460.00 to	470.00
430 bundles and solids	135.00 to	140.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	80.00 to	83.00
No. 2 dealer bundles	41.00 to	44.00
No. 1 busheling	80.00 to	83.00
Shredder scrap	81.00 to	84.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	38.00 to	41.00
Low phos. 5 ft. and under	79.00 to	82.00
Low phos. 2 ft. punchings	90.00 to	93.00
Electric furnace bundles	93.00 to	96.00
RR specialties	81.00 to	84.00
Rails, 2 ft. and under	92.00 to	95.00
Cupola cast	58.00 to	61.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	51.00 to	52.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	36.00 to	37.00
No. 1 busheling	69.00 to	70.00
Drop forge flashings	45.00 to	46.00
Machine shop turn.	25.00 to	26.00
Mixed borings and turn.	15.00 to	16.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	15.00 to	16.00
Heavy breakable cast	34.00 to	35.00
Mixed cupola cast	50.00 to	51.00
Automobile cast	73.00 to	74.00
Stainless		
18-8 bundles and solids	470.00 to	480.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	36.00 to	39.00
No. 1 dealer bundles	78.00 to	81.00
No. 2 dealer bundles	37.00 to	40.00
Machine shop turn.	1.00 to	3.00
Shoveling turnings	5.00 to	8.00
Low phos. plate	74.00 to	77.00
Electric furnace bundles	71.00 to	74.00
Galvanized bundles	61.00 to	64.00

Cleveland

No. 1 hvy. melting	$ 60.00 to	$ 63.00
No. 2 hvy. melting	27.00 to	30.00
No. 1 dealer bundles	76.00 to	79.00
No. 1 factory bundles	74.00 to	77.00
No. 2 bundles	22.00 to	25.00
No. 1 busheling	76.00 to	79.00
Machine shop turn.	1.00 to	4.00
Mixed bor. and turn.	1.00 to	4.00
Shoveling turnings	3.00 to	6.00
Cast iron borings	6.00 to	9.00
Cut structural & plates, 2 ft. and under	92.00 to	95.00
Low phos. punchings plate	92.00 to	95.00
Drop forge flashings	31.00 to	34.00
Foundry steel, 2 ft. & under	57.00 to	60.00
No. 1 RR hvy melting	61.00 to	64.00
Rails, 2 ft. and under	97.00 to	100.00
Rails, 18 in. and under	98.00 to	101.00
Steel axle turnings	67.00 to	70.00
Railroad cast	80.00 to	83.00
No. 1 machinery cast	87.00 to	90.00
Cupola cast	60.00 to	63.00
Stove plate	45.00 to	48.00
Stainless		
18-8 bundles	325.00 to	335.00
18-8 turnings	275.00 to	285.00
430 bundles	80.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 busheling	38.00 to	39.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.	9.00 to	10.00
Mixed bor. and turn.	16.00 to	17.00
Shoveling turnings	17.00 to	18.00
Cast iron borings	15.00 to	16.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	50.00 to	51.00
Scrap rails, random lgth.	30.00 to	31.00
No. 1 machinery cast	71.00 to	72.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 63.00 to	$ 64.00
No. 2 hvy. melting	52.00 to	53.00
Foundry steel, 2 ft.	52.00 to	53.00
No. 1 dealer bundles	63.00 to	64.00
No. 2 bundles	49.00 to	50.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	63.00 to	64.00
Rails, random length	69.00 to	70.00
Rails, 18 in. and under	84.00 to	85.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	75.00 to	76.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	96.00 to	97.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 64.00 to	$ 65.00
No. 2 heavy melting	59.00 to	60.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	63.00 to	64.00
Shredder scrap	77.00 to	78.00
Machine shop. turn.	24.00 to	25.00
Shoveling turnings	35.00 to	36.00
Cast iron borings	35.00 to	36.00
Electric furnace bundles	62.00 to	63.00
Elec. furnace, 3 ft. & under	59.00 to	60.00
Structural and plate, 2 ft.	80.00 to	81.00
Structural and plate, 4 ft.	77.00 to	78.00
No. 1 RR hvy. melting	63.00 to	64.00
Scrap rails, random lgth.	68.00 to	69.00
Rails, 18 in. and under	84.00 to	85.00
Angles and splice bars	76.00 to	77.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	59.00 to	60.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	57.00 to	58.00
No. 2 bundles	27.00 to	28.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	8.00 to	9.00
Cast iron borings	11.00 to	12.00
Low phos. 18 in. and under	75.00 to	76.00
Rails, random length	60.00 to	61.00
Rails, 2 ft. and under	80.00 to	81.00
No. 1 cupola cast	60.00 to	61.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	69.00 to	70.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	480.00 to	500.00
18-8 turnings	380.00 to	400.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	44.00 to	46.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	44.00 to	46.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 42.00 to	$ 44.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	13.00 to	15.00
Machine shop turn.	6.00 to	8.00
Cast iron borings	6.00 to	8.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	30.00 to	32.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 dealer bundles	10.00 to	12.00
Machine shop turn.	6.00 to	8.00
Shoveling turnings	10.00 to	12.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under (foundry)	86.00 to	88.00
No. 1 cupola cast	88.00 to	90.00

Seattle

No. 1 hvy. melting	$ 59.00 to	$ 61.00
No. 2 hvy. melting	48.00 to	50.00
No. 2 bundles	38.00 to	40.00
No. 1 cupola cast	94.00 to	96.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 55.00
No. 2 heavy melting cut 2 ft. and under	52.00
No. 1 dealer bundles	60.00
No. 2 bundles	30.00
Mixed steel scrap	34.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	25.00
Short steel turn.	28.00
Mixed bor. and turn.	15.00
Cast scrap	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 67.00 to	$ 68.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	34.00 to	36.00
Machine shop turn.	19.00 to	20.00
Crushed turnings	35.00 to	37.00
Shredder scrap	67.00 to	68.00
Cut structural plate 2 ft. and under	84.00 to	86.00
Unstripped motor blocks	58.00 to	60.00
Cupola cast	71.00 to	73.00

STEEL PRICES

Codes identify Producers listed in the Key on page 75. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10, U1	$453.00
R3	$453.00
Midwest	
R3, U1, W5	$453.00
S1	$453.00
C10	$453.00
K2	$453.00
W5	$453.00
West	
B3(2)	$463.00
C6	$453.00
South	
A7	$453.00
Alloy, East	
R3, C10	$492.00
B3	$492.00
Midwest	
W8, W5, C10	$492.00
S1, U1	$492.00
R3	$492.00
West	
B3	$502.00
C6	$469.00
South	
A7	$492.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7	24.15
C20	22.90
W8	22.90
I3, T10, U1, N4	23.90
West	
C6	25.10
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	23.90
W8	24.15
U1	23.90
I3	23.90
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	23.90
I3	23.90
West	
U1	24.40
C6	24.15
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut ll Edge—all widths, East	
B3, U1	22.05
J3	22.05
Midwest	
A7, D1	22.05
I4	21.45
S1, J3, D1	22.05
W3	22.05
N4	22.55
W5	22.05
U1	22.05
B3, G2, I3, M2, R3, G3	22.05
West	
K1	20.80
B3	24.70
South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
R7, S10, B4	29.60
P15	24.80
S7	Cmp*
U1	35.30
D1(1)	Cmp*
B4	31.55
Midwest	
G4	24.80
I4	35.30
W14	22.95
S1, J4	34.05
T4	Cmp*

*Composite pricing

West	
U1	33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, (plus extras)†	
Midwest	
M2, G3, R3, W3, I4, J3, G2, I3	22.05
A7	22.05
S1	22.05
West	
K1	22.05
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)†	
S1	24.60
G4	25.80
I4	23.70
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	42.60
P15	32.10
Midwest	
I4	41.80
S1	42.30

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	22.05
J3	22.05
U1	22.05
Midwest	
A7, U1, B3, G2, G3, I3, M2, R3, W3	22.05
S1, W5, D1	22.05
J3	22.05
I4	21.15
West	
U1	21.30
K1	22.05
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2), U1	26.15
J3	26.15
Midwest	
B3, I3, G3, R3, M2, U1(2)	26.15
G2, W3, M11	26.15
I4	22.00
J3, A7	26.15
S1, W5, D1	26.15
West	
U1	26.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2), U1	28.00
Midwest	
J3, D1	28.00
I3, W5, S1	28.00
U1, A7, R3, Y1	28.00
G2, W3, M11	28.00
West	
K1	27.15
U1	28.50
South	
U1	28.00
R3	28.00
Enameling, Midwest	
A7, I3, U1, J3	27.65
S1	26.50
Long-Terne, Midwest	
W5	28.30
A7, U1	29.35
R3	29.35

†Actual weight basis

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
B3	23.25
South	
G7	22.35

Tinplate

Electrolytic Tinplate

	per base box
Single Reduced (70 lb)	
East	
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$26.79
U1	26.79
South	
U1	$26.29
Double Reduced (55 lb)**	
Midwest	
M11 (50 lb)	$21.49
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$21.99
U1	21.99
South	
U1	$21.49
Black Plate	
Single Reduced (75 lb)*	
East	
B3	$24.01
Midwest	
J3	$24.01
M11	24.01
I3, U1, W5	24.01
W3	24.01
West	
K1	$24.01
U1	23.36
Double Reduced (55 lb)	
East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

*70 lb—base weight extra 45¢
**50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled
(Special quality)

East	
R3, K3	25.80
R5	25.80
B3(3), J3	25.80
U1, C10	25.80
Midwest	
A7	23.95
U1, I3, I4, C20, N4	25.80
R3, T10	25.80
K2	25.80
I3	19.50*
West	
B3	25.80
C6	24.45
B3	24.70
South	
A8	20.65
A7	25.80
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
C21	21.15
J3(4), L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	31.00
M1	23.025
B4, C10	31.00
Midwest	
B5, W10, Y1, W8, R3	33.25
J3	31.00
B1	19.80
L2	30.75
N9	31.00
P3	19.85 + CMS
W14	22.20
J3(3)	31.00
B5	31.25
J3	31.00
West	
B5	31.20
B5	34.90
R3	37.15
South	
B5	32.85
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10, U1	27.95
R3	27.95
J3	27.95
Midwest	
A7, U1, R3	27.95
I3, C10	27.95
I4	24.85
I3	21.00*
West	
B3	27.95
B5	18.50
C6	26.60
B3	27.10
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	37.90
M1	28.025
R4	25.65
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	34.25
Midwest	
B5, R3, C10	37.35
C2	28.275
J3, M9, W10	34.85
P3	22.75
B1	22.70
N9	34.85
L2	34.65
B5	35.10
J3	36.00
J3	34.85
West	
R3	40.75
B5	35.20
B5	38.25
South	
J3	35.85
C16	28.00
B5	36.75

Plates

Carbon Steel, East	
B3(2), U1	25.75
L4	25.75
P2	25.75
J3	26.75
Midwest	
B3, R3, S1	25.75
I3	24.25
J3, A7	22.80
U1, I4	25.75
R3	26.75
West	
A7, B3, C6, O2	24.25
K1	23.50
U1	25.75
South	
R3	25.75
A7	25.75
U1	25.75
Alloy, East	
B3, J3	33.55
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	33.55
G2, G3	33.55
I4, U1	33.55
West	
B3	33.55
O2	30.55
K1	31.30
South	
A7	27.55

Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
U1	27.70
A7, R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
A7	25.95
C6	24.95

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities* / City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	22.23	28.98	31.18	31.63	21.81	24.68	17.33	33.40	42.10	52.60	69.58	73.19
Baltimore	26.67	28.19	35.29	37.30	24.85	28.64	19.19	36.65	55.85	59.91	69.79	76.32
Birmingham	21.92	29.13	31.27	32.10	21.48	24.36	17.14	31.75	49.31	68.90	68.16	74.43
Boston	25.11	29.68	34.62	45.11	35.11	37.52	20.95	41.20	48.40	52.69	62.29	67.33
Buffalo	29.13	35.79	40.51	43.66	33.04	26.77	17.80	41.10	39.03	48.82	56.33	64.06
Chicago	23.30	32.19	34.60	33.75	23.87	26.21	15.94	32.66	37.01	42.32	50.07	56.70
Cincinnati	24.85	29.72	33.23	34.55	24.63	28.78	15.20	30.51	35.17	40.02	45.20	51.15
Cleveland	27.47	32.64	33.35	33.08	25.73	28.01	16.01	32.92	35.76	41.57	46.44	52.48
Denver	33.10	40.58	37.46	41.88	34.45	35.59	21.42	44.77	51.78	59.12	67.62	75.96
Detroit	25.06	31.96	32.35	36.92	27.28	34.81	19.47	38.44	35.65	39.68	56.96	51.26
Houston	33.42	31.40	34.58	41.97	32.24	38.36	17.35	39.48	39.28	45.22	53.75	60.10
Kansas City	25.26	31.98	34.70	30.64	27.34	28.84	17.57	34.14	40.72	51.71	57.20	64.82
Los Angeles	31.07	37.43	39.98	46.37	36.57	38.90	34.77	51.12	63.18	72.74	79.09	90.58
Memphis	28.23	36.53	36.43	36.92	27.28	34.81	19.47	38.44	52.82	56.96	67.85	77.44
Milwaukee	24.20	31.40	33.85	32.90	24.56	28.00	15.71	33.04	35.61	41.88	46.30	53.45
New York	24.20	30.17	33.20	43.39	29.93	33.54	19.69	42.13	46.59	53.04	62.17	69.31
Philadelphia	28.39	35.11	36.92	46.98	30.80	35.97	19.70	39.64	46.41	52.66	62.06	69.23
Pittsburgh	26.55	32.56	35.16	41.38	32.45	29.51	20.41	41.30	46.51	54.05	61.11	68.88
Portland	30.68	39.39	42.34	33.60	32.90	38.20	34.08	57.18	61.00	64.10	78.49	....
San Francisco	30.59	38.29	40.39	46.32	37.98	39.18	30.29	52.11	63.09	72.30	78.49	86.10
Seattle	30.86	37.25	29.01	47.46	31.08	35.32	31.89	51.68	64.02	70.14	73.83	87.67
Spokane	21.80	32.39	34.23	37.24	33.25	25.16	20.58	41.24	42.02	46.30	....	58.32
St. Louis	25.28	31.06	33.30	35.96	27.25	29.68	16.09	33.14	38.46	43.65	51.02	57.46
St. Paul	24.77	30.26	33.05	35.73	26.33	28.12	15.45	34.33	36.60	41.88	46.58	53.31

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate ¼" x 84; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ¾-2 15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1⅜" round; Cold drawn—1" round; Hot-rolled 4140—1⅜" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

NOTE

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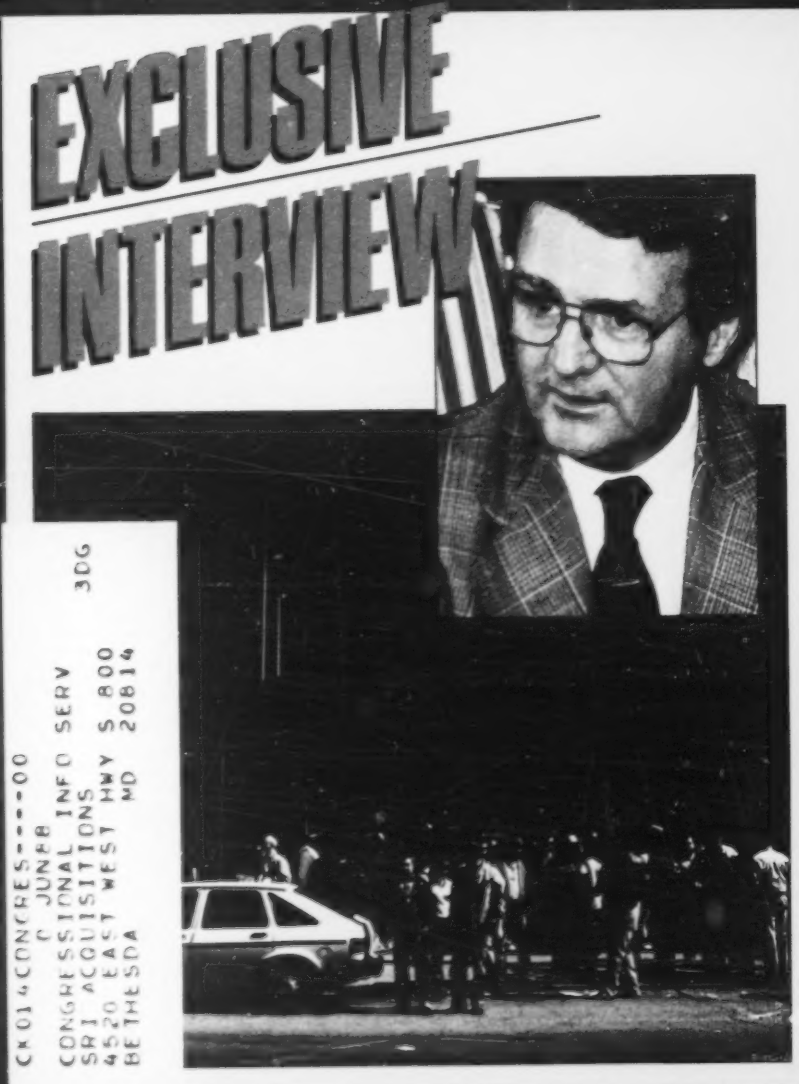
72-73.

Chilton's

JULY 22, 1983

IRON AGE

THE MAGAZINE FOR METALWORKING MANAGEMENT



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Secretary of Labor Raymond Donovan Talks About Jobs and the Jobless in America

Also: QUALITY IN AMERICA—PART I IN A SERIES: ARE WE TURNING IT ARQUND IN QUALITY?

A REPORT FROM EUROPE'S BIG MACHINE TOOL FAIR

MANUFACTURING SYSTEMS SERIES 42: HOW COMPUTERS ARE CHANGING THE WAY WE TRAIN WORKERS

VOL. 226, NO. 20

IRON AGE

JULY 22, 1983

COVER STORY

40 **IS AMERICA TURNING IT AROUND IN QUALITY?**
In this first article of a special five-part series on quality, the current quality scene in the U.S. is reviewed. It would appear that some top executives are beginning to wake up.

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27 **AMERICA'S LABOR CHIEF TALKS ABOUT JOBS & THE JOBLESS**
Secretary Raymond Donovan comments on the change in worker skills, displaced workers and responsibilities for retraining.

50 **MMS SERIES 42: COMPUTERS CHANGE WORKER TRAINING**
Training in the maintenance of complex manufacturing systems is causing headaches. Computer-based training may help.

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The EMO-5 machine tool exhibit in Paris made it clear European producers won't take a back seat to Japan or the U.S.

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Stumbling toward the year 2000

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The nation's specialty steelmakers have mixed feelings about President Reagan's mixture for controlling steel imports.

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Business bailouts aren't always bad, says a former Treasury official. The three biggest bailouts have had rich payoffs.

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It appears the recession for durable goods new orders ended in January. Orders have gone up now for three straight months.

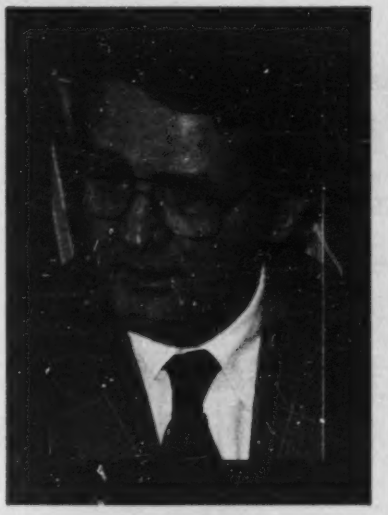
39 **YOU AND YOUR JOB**
More companies, recognizing the experience and skills of older workers, are casting around for ways to keep them employed.

47 **TECHFRONT**
New and tougher demands are hyping the market for graphite-fiber-reinforced glass matrix composites.

64 **PRODUCTS NEWSFRONT**
Rank Precision's inspection machine provides integrated inspection routines that are easily learned by users.

69 **MATERIALS NEWSFRONT**
Steel demand continues at a steady pace which, considering the season, may be an indication of the long-awaited turnaround.

76 **BUSINESS FORECAST**
The nation's unemployed workers are still not an endangered species, but there were fewer workers without jobs in June.



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Quality in product design: Part II in a series; Developments in aerospace materials.

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Reagan draws mixed reviews on specialty steel decision

Half a loaf is better than none unless it's your half that's missing.

That might summarize reactions of domestic specialty steel producers to the import program of the Reagan Administration.

The Administration established four-year quotas for tool steels and for stainless rod and bar. These products accounted for half the specialty imports in 1982. For this half of the market, the Reagan program is expected to help.

For the half represented by stainless sheet, strip, and plate, the government is imposing tariffs that start at 8 and 10 pct and decline over four years.

Producers of flat rolled stainless don't think the tariffs will help. Quotas were sought and there is sharp criticism of the import program.

"We're obviously bitterly disappointed," said Richard P. Simmons, president of Allegheny Ludlum Steel Corp. "The President has done the minimum."

The only effect of the tariffs will be to increase the subsidies of foreign governments, Mr. Simmons predicted. "We expect foreign producers will absorb all the tariff," he added.

Carpenter Technology Corp. expects some immediate benefit from the quotas. "We think they should have a favorable impact on the bar, rod and tool steel markets," said Paul R. Roedel, president of Carpenter. "They should restrain the import levels."

Mr. Roedel is referring to aggregate levels of a product line that includes tool steels, but is particularly strong in stainless bars.

For Latrobe Steel Co., which specializes in tool steels, the quota is not seen having much immediate effect. "The relief will be moderate because the market is so weak," said Marshall Schober, president of Latrobe.

The tool steel quota of 22,400 tons is down sharply from the 40,000 tons imported in 1982. Because of the market weakness, however, imports in the first quarter were down to an annual rate of 30,000 tons.

The quota doesn't include band saw or chipper knife grades. That means the ceiling is really around 26,000 tons, which isn't too far below the first quarter level.

"We had asked for a share of the market rather than an absolute number," said Mr. Schober. When demand revives, he notes, domestic producers will benefit from having a fixed tonnage quota. In the current slump, the tonnage approach is hurting.

"I don't want to look a gift horse in the mouth," said Mr. Schober, "but I need help now."

The stainless flat rolled tariffs will be applied on top of dumping duties of 7.4 pct on stainless sheet from West Germany and 3.4 pct on stainless sheet from France. Dumping duties have also been applied to stainless strip from these countries.

British producers of stainless sheet and strip were exonerated in dumping proceedings. However, a countervailing duty of 19.3 pct has been placed on stainless plate from Britain.

Mr. Simmons said he will be closely monitoring stainless imports. Since it has been established that the old prices reflect dumping or subsidy, he said, a failure of the tariffs to bring price increases will have to mean an increase in the illegal margins.

"If they haven't raised their prices by the amount of the tariffs," he said, "we think we will have grounds for other cases."

If the tariffs are passed on in prices, imported stainless could still be selling below the domestic level. Mr. Simmons cited the June survey of the Steel Service Center Institute. This showed that 13 pct of the imported stainless was going for 20 pct or more below the domestic price and 47 pct was going for 10 to 20 pct below.

Mr. Roedel of Carpenter saw good and bad in the Administration's program. "I was pleased the President saw fit to take an action recognizing the problem of unfair trade in our industry," he said, but added, "The tariff approach on flat rolled is inadequate."

Like Mr. Simmons, he felt foreign producers will simply swallow the tariffs. "If you've got subsidies now, all you need is a little more subsidy and that takes care of it," he said.

Meanwhile the Reagan Administration decision to impose tariffs and quotas on imports of specialty steels is causing widespread anger overseas.

British Prime Minister Margaret Thatcher denounced the U.S. step as a "deplorable" reversal of the spirit of cooperation achieved at the recent Williamsburg, Va., summit meeting.

A spokesman for the European Economic Community (EEC) said the group is examining the U.S. move in light of provisions in the General Agreement on Tariffs and Trade (GATT). "If we are correct," the spokesman said, "European governments will be able to compensate their steelmakers' losses resulting from the U.S. decision."

West German Economics Minister Otto Lambsdorff said he supported the EEC's position and expressed "astonishment" at Mr. Reagan's action.

Mrs. Thatcher ordered her Minister of Trade and Industry Paul Channon to "raise the matter" with U.S. Special Trade Representative William Brock. Mr. Channon labeled the new restrictions "scapegoatism" and said the British consider them a blatant return to increased protectionism.

"There is no open trading process in this industry," Mr. Brock told European journalists in a trans-Atlantic press conference. He said the U.S. had to act to protect an industry that was being denied an opportunity to compete. "We had been put in a position of trying to compete in a world market in which subsidies abound, where government intervention is rampant," he said.

Mr. Brock believes the U.S. action is consistent with the GATT rules. "The whole structure of our approach was designed to give us an opportunity to say to other countries it is intolerable to continue the degree of government intervention that exists in the world. We have announced our willingness to engage in discussions with individual

Reagan's recipe for specialty steel imports

	1982 imports (000) tons	Pct of 1982 U.S. supply	Reagan 4-year program 1	2	3	4
			Tariff			
Stainless sheet & strip	87.3	13.5	10%	8%	6%	4%
Stainless plate	13.3	12.5	8%	6%	5%	4%
			Tons			
Stainless bar	40.0	29.4	27,000	27,800	28,600	29,500
Stainless rod	21.9	50.0	19,100	19,700	20,300	20,900
Tool steel	40.1	49.0	23,400	23,100	23,800	24,500

Source: AISI—U.S. Trade Representative

countries or trading units on marketing arrangements."

The Europeans contend that any problems experienced by U.S. manufacturers are "not due to steel imports" but to the "overall economic situation."

Industry group seeks changes in trade laws

Widespread revamping of America's trade laws is being sought by a broad-based industrial coalition newly formed in Washington.

Called the Trade Reform Action Coalition (TRAC), the group includes companies in the steel and steel products, valves, forgings, and nonferrous metals industries as well as textiles, apparel, leather products, numerous consumer goods and industrial equipment manufacturers.

TRAC has presented to members of Congress "a comprehensive package of trade reform proposals," according to its chairman, Jim Conner.

"The trade laws," he says, "need to be less complex, less expensive, less arbitrary, yet more certain as to their outcome, more expeditious, more fair and more effective for all petitioners." Those seven concepts, Mr. Conner adds, "sum up our proposals to the Congress."

The group claims its proposals would shorten the length of time it takes for industries to gain relief in antidumping and countervailing duty cases and reduce administrative discretion in those proceedings to make them less arbitrary and more fair.

Major changes would be aimed at Sections 301 and 201 of the U.S. Trade Act. For examples, TRAC wants Section 301 modified so the U.S. government could take action against foreign governments that engage in "industrial targeting."

"This idea," Mr. Conner explains, "depoliticizes Section 301 proceedings by placing such investigations and decisions in an administrative agency and subjecting them to judicial review."

The injury causation test under Section 201 would be reduced under the TRAC plan "so it is no more severe" than the standard required under the General Agreement on Tariffs and Trade (GATT).

The coalition stresses that it is not seeking "protectionism." "Quite the reverse," Mr. Conner says. "These proposals and others being recommended by a wide range of American industries represent a realistic effort to provide fundamental reforms in order to restore more equitable competitive conditions in the U.S. market."

TRAC also does not believe its plans would reverse U.S. trade policies but would, instead, aim at adequate administration and constructive modifications of existing trade remedy laws. There is a vital need, according to the coalition, for simplified procedures to reduce costs and data requirements for petitioners.

Among TRAC's members are the Metalworking Fair Trade Coalition made up of 27 trade associations employing 1.4 million persons and generating sales of $75 billion; the Steel Service Center Institute, which represents about 500 North American metal distributors; and the American Iron and Steel Institute.

Steel execs differ on merger rule changes

"We oppose any weakening of our present antitrust laws," said Dennis J. Carney, chairman of Wheeling-Pittsburgh Steel Corp.

Testifying before the Senate Judiciary Committee earlier this month, Mr. Carney argued that the solution to the steel industry's problems did not lie in easing the restrictions on mergers and joint ventures.

"Rigorous enforcement of our antitrust laws is essential to protect customers from adverse effects of greater concentration of economic power in our industry," he said.

'We disagree with the AISI proposals to relax antitrust laws and their enforcement.'

Dennis J. Carney, chairman, Wheeling-Pittsburgh Steel Corp.

Strongly in favor of steel combinations is David M. Roderick, chairman of United States Steel Corp. and also chairman of the American Iron & Steel Institute (AISI). Earlier this year, AISI came out with a position paper that called for government policies designed to permit steel mergers.

"Specifically, we disagree with the AISI proposals to relax antitrust laws and their enforcement," said Mr. Carney. He cited the effects of past steel mergers.

"I submit that these mergers have made little or no contribution to the solution of the basic problems confronting us," he added.

The Senate committee was given a limited endorsement of flexible merger policies by Donald H. Trautlein, chairman of Bethlehem Steel Corp. "We believe that every transaction should stand on its own merits and be evaluated in accordance with our present laws and procedures," said Mr. Trautlein.

He called for an American steel policy. This would take in trade and capital matters as well as antitrust laws.

Mr. Carney also called for broad treatment of steel problems. He said government financial assistance was needed to modernize the domestic steel industry.

"An effective program should channel low-interest loans and loan guarantees into modernization projects prudently selected," he said.

Bendix regroups Automation Group

Bendix will now emphasize new technology, engineering and assembly and de-emphasize machining, according to a restructuring plan.

The plan, developed during the recession in the machine tool industry and aimed at dealing with increased foreign competition, will enable Bendix Automation to compete globally and respond quickly to the changing technological needs of its customers, says Frederick W. Searby, Bendix Automation president and group vice-president, Allied Corp.

The new plan follows reorganization of the group earlier this year into three sectors: production systems, production equipment and components.

It includes the sale of Cutting Tools Division operations in Greenfield, Mass., Los Angeles, Calif. and South Beloit, Ill.; Tool Holders Division operations in Chicago; Midwest Machine & Tool, Cleveland; and Sterling Castings, Wellington, Ohio.

There will also be some consolidation of manufacturing operations. The Solon Road facility of the Turning Machine Division in Cleveland will be closed and its operations integrated into a second Cleveland facility.

The Burbank, Calif., facility of Automation and Measurement Division will also be closed.

There will also be some acceleration

METALWORKING ORDER TRENDS

Orders strength mirrors economy's strength

Orders received by durable goods producers continued on their modest but steady roll in May.

May orders totaled $84.5 billion, and were up 1.3 pct over April.

The May increase marked the third straight monthly gain for durables new orders. It now looks like the recovery for durables orders—as well as for the overall economy—may have begun in January. Over the first five months this year, orders have risen in four of those months.

Further confirmation of an in-place recovery is noted in the table here. May orders for the six major metalworking industry groups—primary metals, nonelectrical and electrical machinery, transportation equipment, fabricated metal products and instruments—were up a solid 11 pct from a year ago. May orders totaled $71.2 billion. A year ago, orders volume came to $64.1 billion.

A glance along the product lines on the table shows 'plusses' dominating the latest monthly comparisons. Moreover, 'plusses' occurred in every major industry group.

The transportation equipment industry was the only one showing a decrease in orders volume in May. But this wasn't as bad as it might look.

U.S. Commerce Department analysts note, "While orders for transportation equipment declined $1.7 billion, or 8.6 pct, to $18.5 billion, the decrease was attributable to a decline in defense orders. Excluding the defense component, orders for transportation equipment increased."

Defense-related product lines are the most volatile over any short-run time span. This remains true based on the most recent data. However, over the longer run, defense business is now shaping up as a real 'plus' in the rebounding economy.

New orders for defense-related capital goods, for example, were down in May by 34 pct to $4.7 billion. Notes the Commerce Department, "Although this series is quite unstable on a month-to-month basis, new orders (defense) have shown a steady upward trend since the beginning of 1980."

For business in general, the great fear is that of a recovery advancing too quickly and strongly. That is why eyes are on Congress. It is in a tax-raising mood as it now faces not only the huge budget deficit, but a business recovery threatening to roar ahead at inflation-inducing speed.

Source: U.S. Dept. of Commerce Billions of dollars, seasonally adjusted monthly total, unless otherwise noted		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
Capital Expenditures (Annual Rates)				
U.S. Industry, Total	2nd Qtr.	$302.2*	$293.0	$323.2
Manufacturing, Total	2nd Qtr.	111.0*	109.9	123.8
Manufacturing, Durable Goods	2nd Qtr.	49.6*	50.7	59.0
Mining Industry	2nd Qtr.	13.7*	12.0	16.6
Key Indicators, Durable Goods Manufacturing				
New Orders	May	84.5	83.4	76.4
Shipments	May	83.0	80.5	79.7
Inventories	May	170.7	169.8	183.4
Unfilled Orders	May	300.8	299.3	301.2
New Orders, Metalworking				
Capital Goods Producers, Nondefense Industries	May	22.1	22.6	20.3
Capital Goods Producers, Defense Industries	May	4.7	7.1	4.8
Primary Metals, Total	May	10.0	9.0	8.5
Steel (SIC 331)	May	4.2	3.5	3.9
Iron & Steel Castings (SIC 332)	May	1.3	1.0	0.9
Nonferrous Metals	May	4.7	4.5	3.7
Nonelectrical Mach.-Equip. Industries, Total	May	15.1	14.8	14.4
Engines & Turbines	May	1.1	0.9	1.3
Farm Machinery & Equipment (Shipments)	May	1.0	0.9	1.1
Construction, Mining & Materials Hdlg. Equip.	May	2.6	2.1	2.3
General Industrial Machinery	May	1.0	1.1	1.3
Fluid Power Equipment** (Index-1972=100)	May	218	210	181
Metalworking Machinery	May	0.7	0.6	0.6
Machine Tools, Total (Millions $, unadjusted)***	May	135.5	118.6	106.0
Machine Tools, Metal-Cutting***	May	93.8	79.3	68.0
Machine Tools, Metal-Forming***	May	41.7	39.3	38.0
Electrical Mach. & Equip. Industries, Total	May	13.6	13.2	11.9
Elec. Transmission Equip. & Industrial Apparatus	May	1.5	1.8	1.7
Household Appliances	May	1.3	1.2	1.1
Communication Equipment	May	4.3	4.4	3.4
Transportation Equip. Industrial, Total	May	18.5	20.2	16.0
Motor Vehicles & Parts (Shipments)	May	12.3	11.3	10.1
Aircraft, Missiles & Parts	May	4.2	7.2	4.9
Shipbuilding & Military Tanks	May	1.1	0.8	0.7
Fabricated Metal Products, Total	May	10.0	9.4	9.4
Instruments, Total	May	4.0	4.1	3.9

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA.

MATERIALS NEWSFRONT

Steel summary: Orders are on a low plateau

Demand for steel is steady at a low level.

Daily orders have been constant for the past month or so. Mill officials say shipments in the third quarter will about match those of the second quarter.

Considering the seasonal influences, say mill officials, it could be said the stability of demand actually represents an upturn. That may be true, but the failure of the market to move up from its low plateau is another major disappointment.

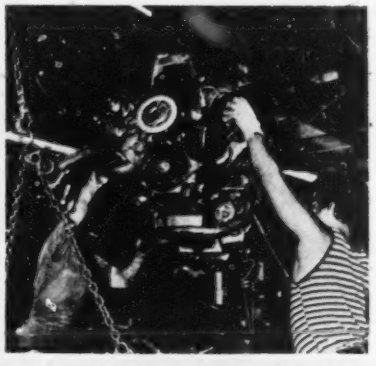
In predicting level third quarter shipments, moreover, steel executives are counting on a fairly good September. Shipments will be down in July and no big upturn has been indicated yet for August.

The hope is that shipments will rise to as high as 7 million tons in September. That would compare with an average of less than 6 million tons in recent months.

About the only positive sign is an upward trend in advanced bookings for sheet products. Cold rolled sheet is ordered further ahead than most grades, and officials think the sheet trend could carry through to products ordered later.

Apart from that, any optimism must be based on external facts. Sales of domestic autos in June were at an annual rate of more than 7 million. That was the highest total in nearly two years.

The final report of the U.S. Commerce Department showed that new orders for manufactured goods rose $3.2 billion or 1.9 pct in May. Orders for durable goods were up $1.1 billion or 1.3 pct.



Steelmakers are still looking for more orders from Detroit.

Despite growing evidence of a recovery, steel users seem to be moving very deliberately.

Auto production schedules call for fewer cars to be built in the third quarter than the second.

Of vital importance to steel companies is the continued slide in capital spending. Orders for non-defense capital goods declined $0.5 billion or 2 pct in May. About two-thirds of the steel produced goes into capital projects.

For domestic steel companies, another negative development was the rise in steel imports to 1.35 million tons in May. That was up from 1.18 million tons in April.

Of particular concern was the continued rise in steel imports from developing nations. According to the American Iron & Steel Institute, these nations have become the largest source of imported steel.

J&L, Republic sue rails over iron ore traffic

Two major steel companies' antitrust suits against eight railroads is being evaluated by U.S. District Courts in New York and Washington, D.C.

The companies—Jones & Laughlin and Republic—allege a conspiracy by the railroads to restrict competition in iron ore traffic unloaded from vessels at Lake Erie ports.

Charged in the J&L suit in Washington are the following companies: Penn Central Corp.; Chesapeake & Ohio Railway; Baltimore & Ohio Railroad; CSX Corp.; Norfolk & Western Railway; Norfolk Southern Corp.; Bessemer & Lake Erie Railroad; and Conrail. In New York, Republic has filed against only the first four in the J & L complaint.

Penn Central is the predecessor to Conrail, while CSX and Norfolk Southern are the parent corporations for the C & O and B & O, and N & W respectively.

The complaints claim the railroads fixed prices for dock handling, dock storage and land transportation services.

Republic charges the railroads refused to publish a dock handling rate for self-unloaders; denied commodity line-haul rates to private commercial docks; refused to permit trucks to carry iron ore from railroad docks or made it economically unattractive to do so; delayed the use of trucks for carrying iron ore from commercial docks; refused to grant volume rates for handling or transporting iron ore; fixed line-haul rates for transporting iron ore; agreed not to lower line-haul rates for iron ore in response to competition from trucks; and prevented companies not under their control from acquiring terminal facilities that could be used to accommodate self-unloaders that would permit access by trucks.

The companies point out the railroads owned equipment tailored to unloading iron ore at the docks from bulk carriers and loading it into railroad cars for further movement to the steel mills. Republic says the railroads recognized that the development of self-unloaders for transporting iron ore over the lakes would significantly reduce the value of their investment in land-based unloading equipment, cause them to lose revenues for unloading at their docks to other commercial docks that could use the self-unloading technology to provide an alternative to the railroad docks, and ultimately pave the way for trucks to pick up iron ore at the docks and carry the freight to the steel mills.

The complainants point out the railroads began to face stiff competition when iron ore was pelletized and thus able to be unloaded from the more efficient self-unloading vessels at ports on the Great Lakes.

Japan steel to U.S. to drop sharply in '83

The Japan Steel Information Center (JSIC) is predicting exports from the Asian nation to the U.S. to be at a 20-year low for 1983. Over the first five months of this year, U.S. steel imports from Japan came to 1.5 million tons, a 42 pct drop from the same period last year.

Japanese Steel Mill Exports To The U.S.

	1982	1983	Pct Change
Jan	283,000	229,000	−19.1
Feb	359,000	216,000	−39.7
Mar	558,000	385,000	−31.1
Apr	373,000	259,000	−29.6
May	370,000	293,000	−20.7

Source: Japan Steel Information Ctr.

Only about three pct of Japan's total output has found its way to U.S. shores thus far, according to the Center. The JSIC asserts China will this year become Japan's leading customer for steel, receiving about six million tons.

Nevertheless, the Center says, American customers have increased inquiries for Japanese steel, especially for flat-rolled products. Since early 1982 exports to the U.S. have been declining, it says. Japanese steelmakers predict monthly shipping levels will go above the 300,000 tons-a-month average of recent months, but still below the half million tons-a-month average of two years ago.

The Commerce Department puts Japanese steel exports to the U.S. in 1982 at 5.2 million tons, the lowest in 15 years and 16 pct less than in 1981.

(Cont. on p. 70)

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Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	156	182	210	126
Buffalo	32	30	30	22
Pittsburgh	179	175	190	130
Youngstown	81	96	94	68
Cleveland	137	134	121	109
Detroit	137	134	129	132
Chicago	474	454	463	313
Cincinnati	96	95	95	78
St. Louis	69	72	67	27
Southern	135	135	86	116
Western	85	85	86	72
U.S. Production	1,581	1,592	1,621	1,193

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82, Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective July 11, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,581	1,592	42,032	42,770
Capability Utilization Rate	54.9	55.3	53.5	53.4

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.297
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 71.50	$ 71.50	$ 70.83	$ 56.17
No. 2 bundles	$ 45.83	$ 46.17	$ 46.50	$ 41.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh .	$ 74.50	$ 74.50	$ 72.50	$ 59.50
No. 1 steel, Philadelphia	68.50	68.50	68.50	59.50
No. 1 steel, Chicago.....	71.50	71.50	71.50	49.50
No. 1 bundles, Detroit..	71.50	71.50	71.50	52.50
Low Phos., Youngstown	77.50	75.50	75.50	63.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	76.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	100.50
No. 1 mach'y cast., Chi..	108.50	108.50	108.50	101.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective July 11, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	80.00	78.00-80.00	7/8/83
Lead	20.00-23.00	19.00-23.00	6/23/83
Magnesium Ingot	138.00	134.00-138.00	6/1/83
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	4/27/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $215.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.65-$1.75
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $430.50
Indium, dollars per troy oz. $3.50
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$280-$290
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $11.99
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

July 4—Holiday
July 5—598.57
July 6—601.63
July 7—602.18
July 8—602.80

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	77⅛	68¼
Yellow brass	64½	61⅛
Red brass	70⅝	65⅛
Comm. bronze	72¾	67
Mang. bronze.....	64⅛	61¼
Free cutting rod ends.....	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire.....	70
No. 2 copper wire.....	62
Light copper.....	53

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire.....	66
No. 2 copper wire.....	58
Light copper.....	49
No. 1 composition	56
No. 1 comp. turnings.....	54
Hvy. yellow brass solids	36
Hvy. yellow brass turnings.....	28
Radiators.....	47

Aluminum

New mixed clips	42	—43
Old sheet.....	39	—40
Old cast.....	39	—40
Clean dry borings	40	—41

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings.....	33	—34
Mixed L.C. clips.....	28	—29
Old sheets and cast	25	—26
Borings and turnings.....	17	—18
Duraluminum clippings.....	28	—29

Copper and Brass

No. 1 copper wire.....	61	—62
No. 2 copper wire.....	54	—55
Light copper.....	48	—49
Radiators.....	38	—39
No. 1 composition	49	—50
No. 1 composition turn'gs.....	45	—46
Cocks and faucets.....	34	—35
Clean heavy yellow brass	32	—33
Brass Pipe	33	—34
New soft brass clippings.....	48	—49

Lead

Heavy soft lead.....	9	—10
Whole batteries.....	3	— 4
Type metal	15	—16
Electrotype.....	13	—14

Nickel

Nickel solids.....	110	—120
Nickel rod ends.....	110	—120
Nickel sheets, clips.....	110	—120
Nickel turnings.....	50	— 60

Zinc

New zinc clippings.....	15	—16
Old diecast zinc	9	—10

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MATERIALS NEWSFRONT

(Effective July 11, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 74.00 to	$ 75.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	90.00 to	91.00
No. 1 factory bundles (auto)	87.00 to	88.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	87.00 to	88.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	26.00 to	27.00
Cast iron borings	25.00 to	26.00
Low phos. punchings plate	88.00 to	89.00
Heavy turnings	54.00 to	65.00
No. 1 RR hvy. melting	88.00 to	89.00
Rails 2 ft. and under	103.00 to	104.00
Scrap rails, random lgth.	86.00 to	87.00
RR specialties	95.00 to	96.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	600.00 to	610.00
18-8 turnings	500.00 to	510.00

Chicago

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	86.00 to	87.00
No. 1 factory bundles (auto)	87.00 to	88.00
No. 2 dealer bundles	44.00 to	45.00
No. 1 busheling	86.00 to	87.00
Shredder scrap	84.00 to	85.00
Machine shop turn.	17.00 to	18.00
Mixed bor. and turn.	18.00 to	19.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	40.00 to	41.00
Low phos. forge crop	89.00 to	90.00
Low phos. punchings plate ¼ in. and heavier	98.00 to	99.00
Low phos. 2 ft. and under	95.00 to	96.00
No. 1 RR hvy. melting	82.00 to	83.00
Scrap rails, random lgth.	83.00 to	84.00
Reroller rails	92.00 to	93.00
Rails, 2 ft. and under	94.00 to	95.00
RR couplers and knuckles	82.00 to	83.00
RR car axles	114.00 to	115.00
No. 1 machinery cast	108.00 to	109.00
Cupola cast	95.00 to	96.00
Stove plate	90.00 to	91.00
Steel car wheels	85.00 to	86.00
Stainless		
18-8 bundles and solids	560.00 to	570.00
18-8 turnings	460.00 to	470.00
430 bundles and solids	135.00 to	140.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	79.00 to	82.00
No. 2 dealer bundles	40.00 to	43.00
No. 1 busheling	79.00 to	82.00
Shredder scrap	81.00 to	84.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	40.00 to	43.00
Low phos. 5 ft. and under	79.00 to	82.00
Low phos. 2 ft. punchings	90.00 to	93.00
Electric furnace bundles	93.00 to	96.00
RR specialties	81.00 to	84.00
Rails, 2 ft. and under	92.00 to	95.00
Cupola cast	58.00 to	61.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	51.00 to	52.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	36.00 to	37.00
No. 1 busheling	69.00 to	70.00
Drop forge flashings	45.00 to	46.00
Machine shop turn.	25.00 to	26.00
Mixed borings and turn.	15.00 to	16.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	15.00 to	16.00
Heavy breakable cast	34.00 to	35.00
Mixed cupola cast	50.00 to	51.00
Automobile cast	73.00 to	74.00
Stainless		
18-8 bundles and solids	470.00 to	480.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	36.00 to	39.00
No. 1 dealer bundles	80.00 to	83.00
No. 2 dealer bundles	37.00 to	40.00
Machine shop turn.	1.00 to	3.00
Shovaling turnings	5.00 to	8.00
Low phos. plate	76.00 to	79.00
Electric furnace bundles	71.00 to	74.00
Galvanized bundles	61.00 to	64.00

Cleveland

No. 1 hvy. melting	$ 60.00 to	$ 63.00
No. 2 hvy. melting	27.00 to	30.00
No. 1 dealer bundles	79.00 to	82.00
No. 1 factory bundles	82.00 to	85.00
No. 2 bundles	22.00 to	25.00
No. 1 busheling	79.00 to	82.00
Machine shop turn.	1.00 to	4.00
Mixed bor. and turn.	1.00 to	4.00
Shoveling turnings	3.00 to	6.00
Cast iron borings	6.00 to	9.00
Cut structural & plates, 2 ft. and under	97.00 to	100.00
Low phos. punchings plate	97.00 to	100.00
Drop forge flashings	37.00 to	40.00
Foundry steel, 2 ft. & under	57.00 to	60.00
No. 1 RR hvy melting	77.00 to	80.00
Rails, 2 ft. and under	102.00 to	105.00
Rails, 18 in. and under	103.00 to	106.00
Steel axle turnings	67.00 to	70.00
Railroad cast	80.00 to	83.00
No. 1 machinery cast	87.00 to	90.00
Cupola cast	80.00 to	83.00
Stove plate	45.00 to	48.00
Stainless		
18-8 bundles	325.00 to	335.00
18-8 turnings	275.00 to	285.00
430 bundles	80.00 to	85.00

Buffalo

No. 1 hvy. melting	$ 33.00 to	$ 34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 busheling	38.00 to	39.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 bundles	20.00 to	21.00
Machine shop turn.	9.00 to	10.00
Mixed bor. and turn.	16.00 to	17.00
Shoveling turnings	17.00 to	18.00
Cast iron borings	15.00 to	16.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	50.00 to	51.00
Scrap rails, random lgth.	30.00 to	31.00
No. 1 machinery cast	71.00 to	72.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	52.00 to	53.00
Foundry steel, 2 ft.	52.00 to	53.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	49.00 to	50.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	69.00 to	70.00
Rails, random length	69.00 to	70.00
Rails, 18 in. and under	84.00 to	85.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	75.00 to	76.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	92.00 to	93.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 67.00 to	$ 68.00
No. 2 heavy melting	61.00 to	62.00
No. 1 dealer bundles	67.00 to	68.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	67.00 to	68.00
Shredder scrap	81.00 to	82.00
Machine shop. turn.	24.00 to	25.00
Shoveling turnings	32.00 to	33.00
Cast iron borings	32.00 to	33.00
Electric furnace bundles	64.00 to	65.00
Elec. furnace, 3 ft. & under	61.00 to	62.00
Structural and plate, 2 ft.	86.00 to	88.00
Structural and plate, 4 ft.	81.00 to	82.00
No. 1 RR hvy. melting	67.00 to	68.00
Scrap rails, random lgth.	68.00 to	69.00
Rails, 18 in. and under	85.00 to	86.00
Angles and splice bars	82.00 to	83.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	59.00 to	60.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 dealer bundles	62.00 to	63.00
No. 2 bundles	29.00 to	30.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	14.00 to	15.00
Low phos. 18 in. and under	80.00 to	81.00
Rails, random length	65.00 to	66.00
Rails, 2 ft. and under	82.00 to	83.00
No. 1 cupola cast	60.00 to	61.00
Heavy breakable cast	30.00 to	31.00
Drop broken cast	74.00 to	75.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	490.00 to	510.00
18-8 turnings	390.00 to	410.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	44.00 to	46.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	44.00 to	46.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 42.00 to	$ 44.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	13.00 to	15.00
Machine shop turn.	6.00 to	8.00
Cast iron borings	6.00 to	8.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	30.00 to	32.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 dealer bundles	10.00 to	12.00
Machine shop turn.	6.00 to	8.00
Shoveling turnings	10.00 to	12.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under (foundry)	86.00 to	88.00
No. 1 cupola cast	88.00 to	90.00

Seattle

No. 1 hvy. melting	$ 59.00 to	$ 61.00
No. 2 hvy. melting	48.00 to	50.00
No. 2 bundles	38.00 to	40.00
No. 1 cupola cast	94.00 to	96.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 55.00
No. 2 heavy melting cut 2 ft. and under	52.00
No. 1 dealer bundles	60.00
No. 2 bundles	30.00
Mixed steel scrap	34.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	25.00
Short steel turn.	28.00
Mixed bor. and turn.	15.00
Cast scrap	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 84.00 to	$ 86.00
No. 2 hvy. melting	48.00 to	50.00
No. 2 bundles	31.00 to	32.00
Machine shop turn.	18.00 to	19.00
Crushed turnings	34.00 to	38.00
Shredder scrap	84.00 to	86.00
Cut structural plate 2 ft. and under	82.00 to	85.00
Unstripped motor blocks	56.00 to	58.00
Cupola cast	71.00 to	73.00

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Chilton's

AUGUST 1, 1983

IRON AGE

THE MAGAZINE FOR METAL PRODUCING MANAGEMENT

MEDIUM STRUCTURAL STEEL: AN OLD PRODUCT FINDS A NEW IDENTITY

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VOL. 226, NO. 21

IRON AGE

AUGUST 1, 1983

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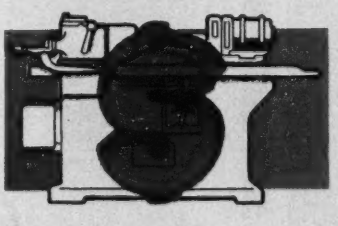

How to finance machine tool equipment.

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STRUCTURALS:

THE MINI-MILLS ARE GETTING ON THE BEAM

The smaller steelmakers are moving into the bigger sizes and joining the market battle between the big mills and their foreign competitors.

BY GEORGE J. MCMANUS

"Our dedication to this end of the business is unflinching," says George E. Trainor, general manager of sales and marketing, Bethlehem Steel Corp.

Mr. Trainor is referring to the structural end of the steel business, with particular emphasis on wide flange beams.

Bethlehem isn't flinching; it is planning a complete modernization of the 48-in. mill at Saucon Works, the Free World's largest structural plant.

However, the company may grimace a little when it considers that three new mills have been built for the structural market. In 1981, Chaparral Steel Co. began operating a 1-million-ton medium section mill at Midlothian, Texas.

The same year, Bayou Steel Corp. started its 500,000-ton medium section mill at La Place, La. Due for startup this fall is the 400,000-ton medium section mill of Ohio River Steel Corp. at Calvert City, Ky.

Taken together, the three mills add nearly 2 million tons of structural rolling capacity to the market. In 1982, the domestic industry's shipments of structurals were a little over 3 million tons. That was the lowest total in over 20 years and shipments so far in 1983 are down another 20 pct.

In short, a big slug of new capacity is bearing down on a depressed market and a market that has been reserved for integrated mills. The market thrust isn't brand new; mini-mills moved into the lower end of the structural market sometime ago.

However, the new installations greatly expand the structural size range of the electric furnace companies.

And for the first time, these companies are equipped to roll wide flange beams, the star products of the structural steel market.

All of which might suggest a repeat of the sequence that saw mini-mills take over the merchant bar market and the integrated producers back away from that market. There will probably be some shifting of domestic positions, but it is not just a case of mini-mills versus maxi-mills.

"They will find their niche," says Mr. Trainor of the electric furnace mills.

A large part of that niche has already been vacated by the traditional structural mills. "It will probably come principally from imports," says Jeffrey A. Werner, senior vice president, commercial, for Chaparral.

Mr. Werner explains that imports have taken over a big chunk of the structural market. "In the South," he says, "the integrated mills had been displaced two years ago."

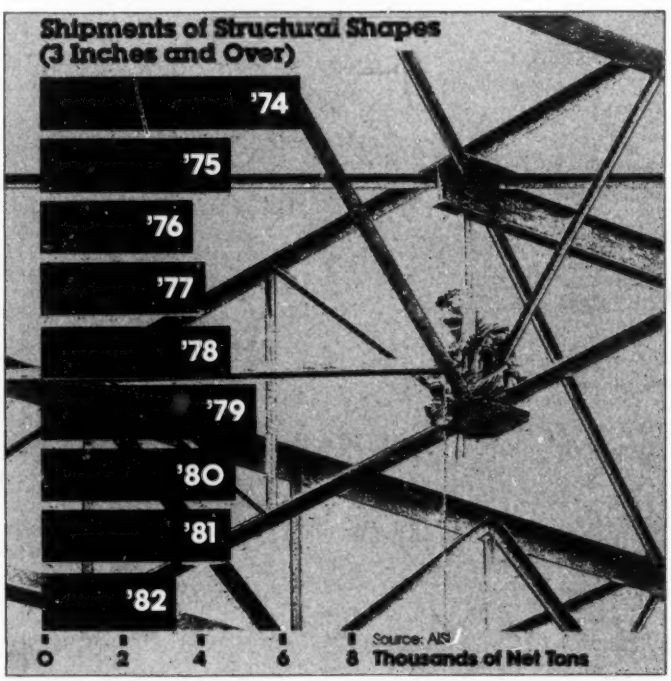
The displacement resulted from import prices that were about $150 a ton under domestic levels, he adds. He also adds that Chaparral is meeting the foreign producers head-on.

"We're closely competitive with imports. We've been growing each month."

It's worth noting that the original mini-mill growth in merchant bars was partly at the expense of imports. The merchant bar market was one of the first to be hit by foreign steel. By 1963, imports of rebars and bar shapes were over 850,000 tons or 15 pct of the foreign total.

As the mini-mills expanded, they pushed foreign mills as well as domestic tonnage producers out of the market. By 1981, only 150,000 tons of rebars and bar shapes were imported. That was less than 1 pct of total imports.

(Cont. on p. MP-5)



In the structural field, as Mr. Werner indicates, there are grounds for believing mini-mill expansion will be mostly a matter of recapture-business from imports. For one thing, foreign steel presents a large target. The 1.5 million tons of structural steel imported in 1982 represented nearly a third of domestic supply.

Secondly, the positions of domestic mills are pretty well defined by size capabilities. The American Iron and Steel Institute classes all shapes over 3 in. as structurals. The new section mills definitely fall in this class.

Within the broad group, says one producer, the dividing line between heavy and light structurals is around 40 lbs a ft. The new mills concentrate on the lighter end of the line. This is not a small portion; about half the wide flange beams produced are light.

Among the established mills, the impact of new competition varies widely. Chaparral goes up to 12 in. on wide flange beams and channels. For one structural plant, this range coincides with 33 pct of the plant's mix.

On the other hand, Bethlehem goes up to more than 36 inches on wide flange beams and up to 730 lbs a ft. On standard structurals, Bethlehem goes up to 24.5 in. and to 121 lbs a ft. United States Steel Corp. also produces king-sized structurals. Inland's 28-in. wide flange mill is another that turns out big beams.

The new section mills now reach only 5 to 15 pct of the wide flange market served by the biggest producers. The size range could change, but production of the jumbo beams is probably not compatible with mini-mill economics.

"To get into much larger sections requires larger blooms and some pretty large rolling mills," says John W. Cox, Inland assistant general manager for heavy products marketing. "That gets into big bucks."

In terms of marketing practices as well as size, the newer electric furnace mills seem pointed more toward import than domestic competition. Imported structurals are produced in standard lengths and are sold mostly through service centers.

Chaparral follows the same general pattern. The company will supply structurals in special lengths, but only if the quantities are above a certain minimum.

Bethlehem, Inland and U. S. Steel prefer orders for structurals cut to special lengths and shipped directly to fabricators. Equipped with reversing mills, the tonnage producers are geared to special lengths and special strength requirements. The continuous mills of the new structural companies are designed more for standardized volume.

Finally, the traditional mills are not ready to write off the entire structural business. There have been some strong reactions to mini-mill and import competition. Last July, Northwestern Steel & Wire Co. came out with its "import fighter program." This provided a price cut of $138 a ton on wide flange beams and channels in certain sizes.

In a related field, Inland slashed $89 a ton off the price of bars made from scrap in electric furnaces. The cut was aimed specifically at mini-mill competition.

These competitive brushes point up the impossibility of isolating the fight between mini-mills and imports. "It's the old pebble in the water kind of thing," says Mr. Cox of Inland. "I don't think you can bring that much tonnage on stream and not impact the whole market."

Equally cautious is S. S. Higley, general manager of structural products for Jones & Laughlin Steel Corp. (J & L). "I think it's foolhardy for our competition to say that they (the mini-mills) are really directing their production at imports," says Mr. Higley.

With a structural line that includes Junior Beams from 6 to 12 in. and wide flange beams up to 6 in., J&L is very much in the size range of the new section mills.

"We feel that long term our mission is to be positioned as a low cost producer regardless of who the competition is," says Mr. Higley.

What makes the competition so intense is the depressed state of the structural market. "The market is in the doldrums except for some highway programs," says Mr. Trainor.

"We really don't see a whole lot," says Mr. Werner of Chaparral. "There's some utility construction. The only other significant area is the Federal highway program."

Mr. Trainor is optimistic. "Good times for us are due in 1984," he says. The highway program will be "bigger than anyone thought it would be."

Mr. Cox of Inland feels the slow climb back has started. Demand for structurals is up 10 to 15 pct from last year's low bottom, he says. Still very weak, he adds, are the freight car, machinery and industrial construction sectors.

Not everyone is prepared to wait for a full recovery in 1984. Armco, Inc., has permanently closed its structural mill at Houston. U. S. Steel suspended structural operations at Fairfield, Ala., a year ago. U. S. Steel's standard structural mill at South Works is down and is scheduled to be modified for rail rolling.

Temporarily idled is the structural mill at U. S. Steel's Geneva Works. The rolling of light structurals has been suspended at Gary Works. Still operating are U. S. Steel's wide flange mill at South Works and a small structural mill at Clairton Works.

Also operating are two structural mills at U. S. Steel's Homestead Works. However, production there has been supplemented by the purchase of light structurals from Northwestern Steel & Wire.

Bethlehem continues to operate its two mills at the Saucon plant. CF&I has temporarily halted the operations of its two structural mills at Pueblo, Colo.

Northwestern Steel & Wire suspended all melting and rolling operations except for wire during labor negotiations in June.

Northwestern was selling structurals from inventories—at the import fighter price.

Inland Steel Co., which has been putting 7-8 pct of its output into structurals, is operating its Indiana Harbor complex.

As of late June, Chaparral was operating its overall plant at 70 to 75 pct of capacity. The medium section mill was running at about 55 pct of capacity and its workload was steadily being increased.

With 1 million tons of melting capacity and 1.5 million tons of rolling capac-

IMPORTS AND EXPORTS OF STRUCTURAL SHAPES—3" & OVER

	Net Tons	
Year	Imports	Exports
1982	1,483,481	56,398
1981	1,976,796	131,379
1980	1,739,543	151,077
1979	1,881,967	139,062
1978	1,798,963	124,445
1977	1,743,228	96,551
1976	1,361,365	97,507
1975	812,429	170,213
1974	1,150,325	356,867

Source: AISI

ity, Chaparral doesn't consider the designation, mini-mill, appropriate. The company calls itself a market mill and the market now extends to 44 states. (The strategy that has gone into this growth was examined in detail in *Iron Age*, June 6, 1983, p. MP-21.)

Apart from strategy, Chaparral has probably benefitted from production cuts elsewhere. With the Geneva and Pueblo mills down, Chaparral is the closest supplier of structurels to the West Coast. With a permanent shutdown at Armco in Houston and with Fairfield down, Chaparral and Bayou are the only Southern producers of medium sections.

Most important of all, the new section mills are designed for a high degree of efficiency. This is basic to the mini-mill concept; you have to have costs that permit competitive selling in the toughest markets.

Both Chaparral and Bayou have modern electric furnace shops. Both are 100 pct continuous casting.

At Chaparral, the 23-in. section mill was designed by Schloemann-Siemag. There are four vertical stands, seven horizontal stands, and five combination stands. The combination stands can be used for universal rolling of wide flange beams or two-high rolling of standard structurals.

Universal rolling is one of the features that sets the medium section mill apart from merchant bar mills. Bar shapes and standard structurals are rolled on fixed pass mills; the shape is imparted by a profile cut into the roll.

Wide flange beams are formed by the vertical and horizontal rolls of the universal mill. The shaping action is such that you can roll a beam with a narrow web and wide, parallel flanges. Since it is the flanges that do the work, this distribution provides maximum strength for a given amount of metal.

The first U.S. application of the universal concept was at Bethlehem in 1907. Using the design of Henry Grey, the company built the 48-in. structural mill that is still operating at Saucon.

That mill brought fame and fortune to Bethlehem; the wide flange shape is still incorporated in the company's emblem. And the wide flange beam is still the basic strength member for sky scrapers and various types of heavy construction.

"It's the guts of the building industry," says Mr. Trainor.

Mr. Werner says something like this is describing the product mix of Chaparral's section mill. "Wide flange is by far the strongest product."

The size range of the Chaparral mill helps to identify medium structurals. The mill starts at 2 in. on angles, 3 in. on channels, and 5 in. on flats. Upper limits range from 6 in. to 12 in. With its original bar mill, Chaparral goes up to 4 in. on angles, channels and flats.

Rapid roll changing, in-line straightening, and automatic stacking are among the features of the Chaparral mill. The operation is fully continuous and rolling is tension-free.

The Bayou section mill, which was designed by Danieli, has a six-stand blooming train, four intermediate stands, and a five-stand finishing train. The last finishing stand can be converted from two-high to universal for wide flange beams.

According to Danieli, the mill is equipped for fast roll changing, in-line straightening, and fully automatic bundling, tying, and weighing.

"It is a very versatile mill," says Albin Palczynski, executive vice president, Danieli of America, Inc. "The product span is fantastic."

The mini-mills are benefitting from low scrap prices now.

To roll rounds as small as ½ in. and channels up to 6 in., says Danieli, the mill is designed to operate in one of three modes: The first six stands; the last nine stands; or the whole mill.

Ohio River Steel will have a non-integrated operation initially. Semifinished steel will be obtained from outside sources, domestic and foreign. Mechanical equipment for the mill is coming from Equipamentos Villares of Brazil under license from Schloemann-Siemag. Siemans of West Germany is providing the electrical equipment.

"We feel our mill will be about as modern as any in the world," says Wolfgang Jansen, chairman of Ohio River and also head of Intercontinental Metals Corp. of Charlotte, N.C. "The mill is fully computerized. It will be a highly productive and efficient mill."

Ohio River will be turning out angles, flats, channels and I-beams ranging from 4 to 10. Plans call for the eventual expansion to 750,000 tons and the installation of melting furnaces.

Mr. Jansen feels the timing of the project is good. "With the economy recovering," he says. "We think by the time the fourth quarter rolls around, the market ought to be in halfway decent shape."

Both Ohio River and Bayou have foreign ties. Owners of Ohio River include West German and Saudi Arabian interests along with Intercontinental. Financing of the $65 million project includes a $45 million secured loan from Banco do Brazil. Bayou is owned by a European group that includes Voest-Alpine of Austria. Chaparral is a joint venture of Co-Steel International, Ltd., and Texas Industries, Inc.

Just how the structural market will shake out is anybody's guess. J&L, for one, is confident it can be competitive on cost. The company's structural products group has its attention focused squarely on this one market area. J&L's 14-in. bar mill at Aliquippa, Pa., was built in 1926, but it has a fairly unusual design. Like the merchant mills and the new section mills, it can roll a variety of shapes. More typical of integrated bar production today are mills that roll only rounds and other solid, symmetrical products.

Also like the new section mills, the Aliquippa unit is continuous and is equipped for universal rolling. Unlike many of the mini-mills, however, J & L is organized by the United Steelworkers of America.

"We've got a cooperative effort here at Aliquippa with our labor-management productivity teams," says Mr. Higley. "We're working to correct restrictive work practices and eliminate inefficiencies."

The mini-mills are benefitting from low scrap prices now, he says, but when the economy recovers, fixed hot metal costs will give integrated mills the edge. J&L feels it also has the advantage of a specialized market situation. Its light structurals go mostly into mobile homes and manufactured buildings.

Another unique mill could soon become a factor in the structural market. At Monessen, Pa., Wheeling-Pittsburgh Steel Corp. is operating a modern rail mill. The company has said it can, and will, roll structurals on this when the market improves.

When the improvement does come, it will be interesting to see how much structural capacity is available. The push of mini-mills into structurals has brought a profound change, says one official. When demand lagged in the old days, he explains, everyone cut production and operated a few turns a week.

Today, says the same official, the mini-mills cut prices and try to maintain maximum output. The result is that some mills are operating at high levels and others not at all. Some of the idle mills are being permanently closed.

The ultimate effect, says the official, will be to bring capacity down to the business levels of weak markets. There will be no reserve available for the recovery. □

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FOUNDRIES ARE WARMED UP FOR THE RECOVERY

Despite some shutdowns, industry members have added quality control programs and revamped their production methods for the coming upturn.

BY KEITH W. BENNETT

Since January, foundrymen have been reporting mild gains in business. It's about time.

If you need problems, ask a foundryman. Last year, his industry's shipments fell 35.6 pct. Even with the recovery of 1977-78, gray iron tonnages have slipped an average 8 pct per year since the 1974 peak.

The three-year squeeze wiped out a lot of foundries, both captive and jobber. It has scared castings buyers, who remember the shortages of 1978-79. What might make them even uneasier is the extent of the recovery in some shops. Some automotive-supplier foundries now are running at capacity. Some auto captives will forego their usual summer shutdown; the demand is that good.

But there may be a bigger surprise: Another wave of new investment is shaping up on the foundry front. There have been inklings of it since January, but in a period when foundries have been running at 20 to 40 pct of capacity—sometimes for two years—nobody expected much new buying of equipment before 1984.

But what about that shrinking foundry capacity? Much of the tonnage loss was in captive high production foundries, designed for big auto engines. And in 1981 and 1982, despite the continuing decline in business, foundries were still bringing on new machinery and furnaces they'd contracted for in the mini-boom of 1977-78.

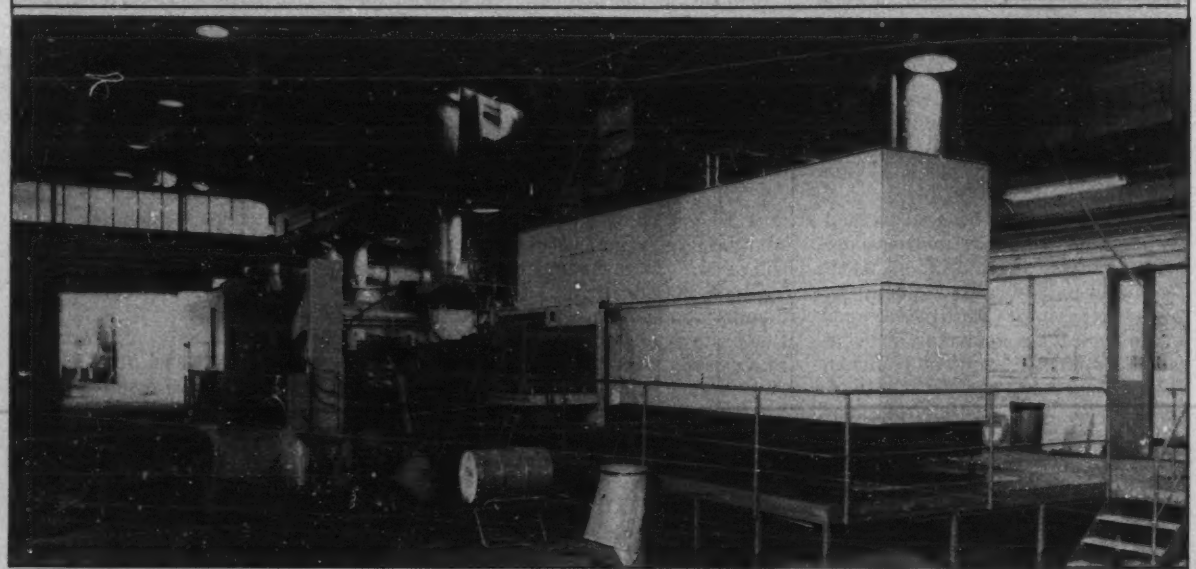
John Ircink, executive vice president for Kenzler Engineering Co., Inc., Milwaukee, says there is activity on both coasts, though the Midwest is still a little slow.

He points out that foundries, including the smaller ones, were automating in the mid-1960s, when matchplate molding machines allowed a lot of smaller shops to automate for an in-

Ferrous Castings, Shipments (Tons)

	Gray Iron	Ductile Iron	Malleable	Steel	Total
1982	6,421,000	1,805,000	286,000	1,088,000	9,600,000
1981	9,729,000	2,201,000	421,000	1,743,000	14,904,000
1980	9,399,000	2,400,000	450,000	1,878,000	14,127,000
1979	11,899,000	2,694,000	724,000	2,025,000	17,342,000
1978	12,417,000	2,896,000	803,160	1,829,670	17,945,830
1977	12,295,000	2,694,000	828,000	1,718,000	17,535,000
1976	11,045,568	1,887,460	847,612	1,802,340	15,582,980
1975	10,621,700	1,824,500	730,700	1,938,000	15,114,900
1974	13,488,900	2,202,300	914,300	2,090,300	18,695,800

Source: U.S. Department of Commerce



Squeeze molds form white iron coal pulverizer balls at Babcock & Wilcox's Iron Foundry. The balls are used by electric utilities to crush coal.

vestment of only $50,000. Kenzler engineered the V-Process steel casting plant at Duluth built by Minneapolis Steel Casting in the 1970s.

"There's a buying swing, from purchasing a 'casing,' to buying a finished part, especially in nonferrous where aluminum disc brake calipers are only starting to come," he says.

Modern Equipment in Port Washington, Wis., a foundry cupola specialist and a subsidiary of Alco Standard Corp., reports a wave of interest in retrofit of existing cupolas. "The market is in retrofit," says Donald Donner, general sales manager, "rather than new capacity. The auto foundries are a prime candidate for retrofit and they've been more active in recent months."

Says F. P. Kaiser, Modern's sales vice president, "There's more desulfurization outside the furnace, a return to refractory lining with a watercooled shell, hotter furnace blast, and a real revolution in the use of programmable controllers." From a 1200°F blast now, he can see 1400°F installations and 1600 to 2000°F hot blast still to come. Charging computers, right at the cupola, are on the way, he notes. Modern Equipment is itself probably going to announce some new licensed technology later this year as the trend develops.

Carl Weigell, president of Motor Castings Co., Milwaukee, would certainly agree. Motor Castings is a cupola foundry pouring gray, ductile, and compacted graphite irons in two plants capable of over 3,400 tons per month. As foundries battle a minor flood of import castings, quality control and value added are key weapons.

Motor Castings recently spun off as a separate unit its own pattern and mold high tech shop. CasTech, this new unit, will also machine castings on a job basis. The closing of some big captive foundries (Allis Chalmers closed a foundry next door to Motor Castings' main plant.) has brought some new customers to Motor Castings. The foundry pours castings from 100 lbs to 5000 lbs, including complete diesel and gasoline engine blocks and heads.

Mr. Weigell uses a phrase that will be heard more often in the future—statistical process control. His foundry even conducts seminars on the subject for suppliers.

"You don't monitor the results of your work, as much as you measure the process itself at every point," says Thomas Gutbrod, sales vice president. "It took a year to develop our statistical process control, and it's our most important job today."

It means more measurements, more instruments and more programmable controllers in the foundry. "By 1985, Modern expects to have all of its products under SPC.

"U.S. companies developed a lot of technology they didn't apply," says Mr. Weigell. "They let the Japanese do it. That technology is available and useful.

"We set up CasTech last year and it was an overnight success. It already does 20 pct outside business and by next year the biggest part of its output will be for outside customers."

Grede Foundries, Inc., is a multifoundry complex with plants in three states. Its aggregate capacity probably totals nearly 10,000 tons per month in gray, ductile and compacted graphite irons.

Grede Chairman Burleigh Jacobs is a keen advocate of the quality drive. Its program is called "Grede's Reliability in Product" (GRIP). It took almost three years to install the program, but it also calls for intensive measurement of every step of every process.

Walking through Grede's Reedsburg, Wis., foundry with plant manager Bru Newton, you'll see specification books bigger than a couple of mail order catalogues at each machine. These include pictures of each part the plant produces. Each operation is recertified each year by a corporate team that includes operations and quality control vice presidents. The workers also sit in on the process, analyzing every part and every job. Process cards in the big catalogues describe, with graphics, each step of a job.

Basically, the worker on each machine in the foundry audits its output, whether molder or grinder or melter. Training can take four months and involves both machine and classroom time. Employees meet weekly with their supervisors and maintain their own machine data charts.

Grede and Motor Castings are job foundries. Deere & Co.'s captive East Moline ductile foundry is a $6 million investment by a farm machine builder. It's part of a complex of three Deere foundries that can pour 30,000 tons per month by one estimate. Donald Grundstrom, who helped create Deere's Waterloo foundry, heads up this newest addition.

The East Moline foundry can pour castings, ranging from a few lbs to one ton. (About 70 pct of the weight of a farm tractor is castings.) East Moline's five molding lines typically handle from 25 to 300 castings.

This is an electric arc melting shop, with high pressure molding. Unlike General Motors, Deere doesn't have a Central Foundry division. But, Mr. Grundstrom points out, the three foundries keep close tabs on new technology. He's already looking at a robot grinder similar to one in use at Waterloo. The three also share inventory stocks of low value, but keep their own high value items, like bearings and gear cases, for rapid maintenance.

"Today's demand is for shorter casting runs," Mr. Grundstrom points out. "The handling systems allow us to run on 'just-in-time' delivery systems. It is looking at outside jobbing sales, as General Motors has done, so its entry into job work offers a net gain in ductile market capacity.

Another big captive, Caterpillar Tractor's Mapleton foundry, is also eyeing the outside market for some of its output. Its big B and D foundries can probably pour up to 30,000 tons of castings per month, pretty much the same output as the Deere complex.

Like Deere, it has added melt capacity, with another Whiting arc furnace to feed metal for a second, new cylinder

liner line, built by Kunkel Wagner. The arc furnaces feed what's been principally a gray iron foundry, but one that is increasing its ductile iron output, says R. L. Claussen, plant manager of the two Mapleton foundries.

In past foundry market upswings, ductile has been particularly sensitive to demand changes, though even gray iron castings in the larger sizes can be in short supply when the market stages a sudden recovery.

"Our engineers are calling for higher strengths," Mr. Claussen points out, "which means more compacted graphite and ductile irons. That is more difficult to machine than gray iron, especially in deep hole drilling, since it acts more like steel. It's a problem that needs some work by tooling manufacturers. You can't machine dry like you can with cast iron."

Caterpillar runs, at D plant alone, two SPOmatic lines, going to a third shift to get better energy rates, a common practice in jobbing foundries. The plant makes engine blocks and compacted graphite heads on two lines.

This is a robot-using foundry. Eight robots dry molds with blowtorches, two spray the molds, and two robots "vent" molds for gas escape. Besides Unimate and Cincinnati Milacron robots, there are three GE Manmates.

Harmony Castings, Inc., is unique in being a V-Process foundry for aluminum castings. It started out in 1980 and built its own equipment, notes Harmony President W. J. Willmot.

"Our timing wasn't the greatest," admits Mr. Willmot, "but each month has been better than the last, and the future looks great." He markets to some high-tech industries, including lasers, portable controllers and computers.

V-Process is a precision process that cuts the machining needed on the castings. Since the process doesn't use binders, there's no need for shakeout systems.

William Kaveny is president of the Herman Corp. and Herman-Sinto V-Process Corp., which holds the U.S. license for V-Process equipment. "V-Process in the U.S. started in steel foundries," he explains. "But has now moved into aluminum and iron. In fact, the most interest right now is in iron castings. The steel installations were bigger castings, but iron founders are looking at mid-sized, 20 lbs to 59 lbs castings, which means they will want faster output from this process. Where you'll see mold speeds of five to ten molds per hour in steel, now we'll see rates in iron of 40 molds to 100 per hour. One top-rated line is already at 60 molds per hour and bids are out for higher speeds."

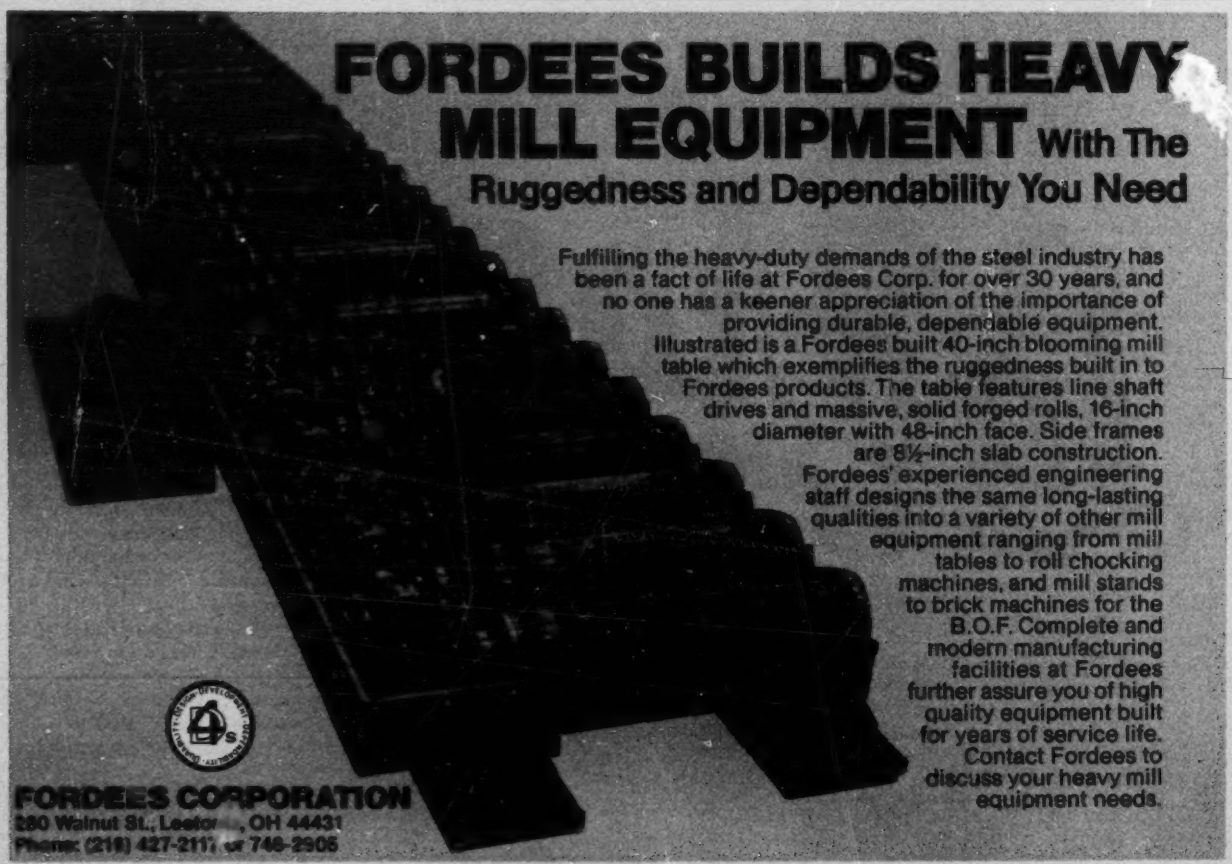
He believes that capital spending by the foundry industry is beginning to look up, though the real gains won't come till the fourth quarter.

Concerning the move to smaller castings sizes in V-Process molding, Robert Seidel, vice president of Harmony Castings notes: "We can break a single (mold) plate into 18x24 in. or 24x36 in. sections, so we can get four different jobs per cast. We'll run 20 pieces and already have had runs as long as 1,000 pieces."

Harmony, with this process needs less machining, but will ship machined castings if the customer wants them, subcontracting the work. It can run its single molding line with five people, but is up to 12 now because volume has risen.

There are younger foundries than Harmony, even in gray iron. Fargron Foundry, Inc., St. Louis, poured its first iron in May, says its president, Thomas Farquhar. This new plant is rated at between 600 and 1,000 tons of castings per month.

Fargron is melting gray iron in a Brown Boveri coreless induction furnace, feeding its metal output into a



For Information, Circle 132

Disamatic automatic mold line. With new equipment like this, smaller foundries can run 400 molds per hour. These are mainly for auto parts which is proving to be a fairly healthy market this year.

Sibley Machine & Foundry Corp., at South Bend, Ind., started in 1874. But William Voll, its president, says that Sibley began a shift from a combination cupola/electric melt system to all-electric melting last year, when it bought a Brown Boveri induction furnace. "Now, we're wondering if it's time to add another electric," he says, "since we can begin to see need for more capacity."

Shrewdly, Sibley left its cupola on standby. Presently, it can ship 1,000 tons per month of castings, machining about 20 pct of what it casts. "Precision machining," Mr. Voll adds, "is a real, coming market. This isn't just rough machining, but precision machining, done in our own Machinery division plant."

Babcock & Wilcox has its own three-foundry complex based in Barberton, Ohio. A small alloy steel foundry does induction melting; a gray and white iron foundry (with some steel castings output) is built around two Lectromelt arc furnaces; and in 1980 it put up a V-Process plant that can handle castings of 25 to 2000 lbs. All three foundries are part of Babcock and Wilcox's Nuclear Equipment division.

Last year, says Richard Pummell, manager of interdivisional products, the division also rebuilt its two arc furnaces at plant No. 2. (gray iron) with new shells, new controls, and an upgraded power factor. "It gives us greater flexibility, especially in large castings," notes Mr. Pummell.

Of electric furnace retrofits, Gregory Uren, foundry sales manager of Lectromelt, agrees that 1983 is more active than 1982 in fitting 'state of the art controls' to existing arc furnaces, both in captive and job shops. "Maybe 50/50 between the two, particularly in steel shops. The cost can range from $35,000 to $80,000 and give off a payoff in as little as three months, or up to one year."

Harry Munn, manager of market development for Disamatic, says his firm can see definite recovery in the (foundry capital goods) market place.

"We chart spare parts against tons of castings, and this figure began to advance in the April-May period," he adds. "Quotes are particularly up from industries that had been quiet, like automotive. Everybody wants lower man-hours per tons of castings, closer tolerances and closer reproducibility."

As examples, he mentions higher molding speeds and increasing demand for PC interfaced equipment.

Benton Foundry, Inc., at Benton, Pa., just put in a new top blow machine for coremaking, notes T. G. Brown, it's financial vice president. "It eliminates some gluing and pasting on what used to be oil cores. Where we got 100 cores per day on the old equipment, we get 600 to 700 on the new."

Foundries didn't lie down and die despite the seemingly bottomless plunge in 1982-83. Atlas Foundry Co., Inc., (1,000 tons per month), Marion, Ind., just added a new Disamatic molding line and core machines, says John Gartland, its president. It's a cupola melt operation, with runs from five pieces to 40,000 in weights to 70 lbs.

By all odds, it's too early in a recovery cycle for foundries to begin new capital programs. And in a disaster like 1982, it seemed almost impossible. But they did it, and in the face of some of the stiffest foreign competition they've yet faced. □

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Robotics Industry: A Different View of Tax Incentives

Leading representatives of the robotics industry met with the Commerce Secretary Malcolm Baldrige earlier this year to outline two necessary government actions that will assist them—Federal standards-setting activities and continued government-sponsored research within universities and public organizations.

"U.S. government policy contains few measures aimed specifically at the robotics industry," the group said in a prepared statement. "None of them address the demand side of the market, so that robot use derives from traditional economic considerations. The programs in place bear only upon robot producers and the connection is often indirect."

There are several proposals for governmental actions that could help foster high technology enterprises. Among these are tax incentives specifically aimed at promoting automation (accelerated depreciation and tax credits are examples). According to some proponents, such steps would directly increase robot usage across a modest range of industries, ultimately generating improvement in productivity, output quality and industry competitiveness.

But arguments against such incentives, as put forth in the robotics industry's presentation, say these steps "might introduce distortions into the existing capital-labor balance among user industries, distortions that could, in the long run, prove economically unjustified.

Also, the proposed tax moves could divert investment capital away from other types of manufacturing activities and channel demand away from other valuable investment markets."

Another drawback: Tax changes could set a precedent and serve as a lobbying point for other automation-related industries such as computers.

Another related idea is more extensive U.S. government encouragement of R&D "relevant to both user and producer firms," according to robotics specialists. This, again, would be through tax policy or publicly supported projects. However, opponents point out this has already been done to some extent through, for example, credits in the 1981 Economic Recovery Tax Act (ERTA).

Say the robotics representatives: "The long-term effects and adequacy of those measures have yet to be determined and it may be prudent to postpone further action until some assessment can be made."

They point out: "The accelerated depreciation schedules for R&D equipment, now in place under ERTA, should provide significant and secure incentives for corporate investments in this area.

U.S. Robotics Industry

	1980	1981	1982	1983	1985	1990
Sales (millions of $)	90	155	205	270	540	2,070
Production (units)	1,450	2,100	3,075	4,000	7,715	31,350

Source: Robots VI Conference

A potential shortcoming of a stepwise R&D credit could be its lack of stimulus for young, fast-growing companies characteristic of research-intensive sectors and from which has come an impressive proportion of technological innovation."

In the international sphere, the robotics presentation said the upcoming Congressional steps to renew the Export Administration Act "does provide an opportunity for debate over the methods and content of current government policy practices." Government policies in the area of export control will clearly be attempts to balance sometimes conflicting objectives and any Federal attempt to dictate a particular solution would prove highly problematic.

As part of reviewing the Act, the robotics industry says, it could be appropriate to re-emphasize the priority of technology transfer over products as a guiding principle for national security considerations.

Reagan has said.

"There are some things which the government could do in the fiscal area that would be of great benefit to the international competitiveness of the computer and other high technology industry," says Stephen G. Jerritts, Sr., vice president, Honeywell Inc.

Mr. Jerritts points to the 25 pct tax credit on increases in qualifying R&D expenses and says it should be made permanent and liberalized. It is due to expire after 1985. "From now until 1985 is not long enough to expect a wholesale improvement in the R&D plans of American industry," he adds.

The White House asserts that President Reagan is supporting legislation that would extend the 25 pct tax credit for R&D expenditures for three years beyond 1985. "We are in favor of providing special tax incentives for R&D," says Mr. Milbergs. "And we're concerned about how they're working and how they can be made better."

The White House also points out that it helped reduce the capital gains tax, thereby making more venture capital available.

Recently, Treasury regulations were passed which would have limited the deductibility of R&D expenses for companies that sell their products overseas. Later, they were suspended. Mr. Jerritts says the suspension should be made permanent.

"Over a period of time," he adds, "these steps will increase the productivity and competitiveness of American industry. It is true that the 1981 and 1982 depreciation changes have had little effect on cash flow in the computer industry. However, we do believe they have had a positive impact on the economy as a whole and, not incidentally, on many of our important customers.

"Antitrust law needs to be modified to grant binding antitrust exemption, applicable to private as well as government lawsuits, for approved R&D joint ventures," says Mr. Jerritts. "Such exemptions would enable U.S. companies to combine complementary resources and skills to accelerate innovation and avoid duplication of effort."

The White House, in order to encourage private sector investment in R&D, says it is helping to ease concerns that cooperative R&D may violate antitrust regulations. It is promoting private sector arrangements that allow firms to conduct research and development efforts that might be too expensive for an individual firm to undertake."

On Capitol Hill, Rep. James Sensenbrenner (R., Wisc.), has introduced legislation to modify state and Federal antitrust laws to allow more joint R&D ventures.

Mr. Jerritts also suggests an "official" identification of declining U.S. industries and allowance of "definite antitrust exemptions for appropriate mergers, consolidations, transfers, rationalizations and other cooperative action between companies within those industries."

Foreign trade and U.S. government policies in that area rank high in the high tech sector's concerns as vital for expansion. In talks with Commerce

EFFECTIVE JULY 18, 1983

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	172	156	203	148
Buffalo	32	32	32	5
Pittsburgh	206	179	199	152
Youngstown	76	81	109	61
Cleveland	129	137	115	113
Detroit	147	137	134	123
Chicago	460	474	408	343
Cincinnati	89	96	97	77
St. Louis	70	69	74	42
Southern	136	135	137	117
Western	88	85	85	65
U.S. Production	1,605	1,581	1,593	1,246

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural) ..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer ..... gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82, Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective July 18, 1983)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,605	1,581	43,637	44,009
Capability Utilization Rate	55.7	54.9	53.6	53.0

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.297
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 71.50	$ 71.50	$ 70.83	$ 56.17
No. 2 bundles	$ 45.50	$ 45.83	$ 46.17	$ 41.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 74.50	$ 74.50	$ 72.50	$ 59.50
No. 1 steel, Philadelphia	68.50	68.50	68.50	59.50
No. 1 steel, Chicago	71.50	71.50	71.50	49.50
No. 1 bundles, Detroit	71.50	71.50	71.50	52.50
Low Phos., Youngstown	77.50	77.50	75.50	63.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	71.50
No. 1 mach'y cast., Phila	95.50	98.50	98.50	100.50
No. 1 mach'y cast., Chi	108.50	108.50	108.50	101.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective July 18, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	79.00-80.00	80.00	7/18/83
Lead	19.00-23.00	20.00-23.00	7/12/83
Magnesium Ingot	138.00	134.00-138.00	6/1/83
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00	38.00-40.00	4/27/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $215.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.65-$1.75
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $422.40
Indium, dollars per troy oz. $3.50
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..... $275-$285
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $12.06
Vanadium $4.94
Zirconium sponge ..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

July 11—303.08
July 12—Holiday
July 13—Holiday
July 14—596.82
July 15—592.23

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	75½	66¼
Yellow brass	64¼	61⅛
Red brass	69½	65⅝
Comm. bronze	71	67
Mang. bronze	63	61¼
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	70
No. 2 copper wire	62
Light copper	53

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	66
No. 2 copper wire	58
Light copper	49
No. 1 composition	56
No. 1 comp. turnings	54
Hvy. yellow brass solids	35
Hvy. yellow brass turnings	28
Radiators	47

Aluminum

New mixed clips	42	—43
Old sheet	39	—40
Old cast	39	—40
Clean dry borings	40	—41

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	34	—35
Mixed L.C. clips	29	—30
Old sheets and cast	27	—28
Borings and turnings	19	—20
Duraluminum clippings	28	—29

Copper and Brass

No. 1 copper wire	61	—62
No. 2 copper wire	54	—55
Light copper	48	—49
Radiators	38	—39
No. 1 composition	49	—50
No. 1 composition turn'gs	45	—46
Cocks and faucets	34	—35
Clean heavy yellow brass	32	—33
Brass Pipe	33	—34
New soft brass clippings	48	—49

Lead

Heavy soft lead	9	—10
Whole batteries	3	— 4
Type metal	15	—16
Electrotype	13	—14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	50	— 60

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

EFFECTIVE JULY 18, 1983

MATERIALS NEWSFRONT

(Effective July 18, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 74.00 to	$ 75.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	90.00 to	91.00
No. 1 factory bundles (auto)	87.00 to	88.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	87.00 to	88.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	26.00 to	27.00
Cast iron borings	25.00 to	26.00
Low phos. punchings plate	88.00 to	89.00
Heavy turnings	64.00 to	65.00
No. 1 RR hvy. melting	88.00 to	89.00
Rails 2 ft. and under	103.00 to	104.00
Scrap rails, random lgth.	86.00 to	87.00
RR specialties	95.00 to	93.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	600.00 to	610.00
18-8 turnings	500.00 to	510.00

Chicago

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	66.00 to	67.00
No. 1 dealer bundles	86.00 to	87.00
No. 1 factory bundles (auto)	87.00 to	88.00
No. 2 dealer bundles	44.00 to	45.00
No. 1 busheling	86.00 to	87.00
Shredder scrap	84.00 to	85.00
Machine shop turn.	17.00 to	18.00
Mixed bor. and turn.	18.00 to	19.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	40.00 to	41.00
Low phos. forge crop	89.00 to	90.00
Low phos. punchings plate ¼ in. and heavier	98.00 to	99.00
Low phos. 2 ft. and under	95.00 to	96.00
No. 1 RR hvy. melting	82.00 to	83.00
Scrap rails, random lgth.	83.00 to	84.00
Reroller rails	92.00 to	93.00
Rails, 2 ft. and under	94.00 to	95.00
RR couplers and knuckles	82.00 to	83.00
RR car axles	114.00 to	115.00
No. 1 machinery cast	108.00 to	109.00
Cupola cast	95.00 to	96.00
Stove plate	90.00 to	91.00
Steel car wheels	85.00 to	86.00
Stainless		
18-8 bundles and solids	560.00 to	570.00
18-8 turnings	460.00 to	470.00
430 bundles and solids	135.00 to	140.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	78.00 to	81.00
No. 2 dealer bundles	39.00 to	42.00
No. 1 busheling	78.00 to	81.00
Shredder scrap	80.00 to	83.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	40.00 to	43.00
Low phos. 5 ft. and under	77.00 to	80.00
Low phos. 2 ft. punchings	90.00 to	93.00
Electric furnace bundles	93.00 to	96.00
RR specialties	81.00 to	84.00
Rails, 2 ft. and under	92.00 to	95.00
Cupola cast	57.00 to	60.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	94.00 to	97.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 53.00 to	$ 54.00
No. 2 hvy. melting	51.00 to	52.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	36.00 to	37.00
No. 1 busheling	69.00 to	70.00
Drop forge flashings	45.00 to	46.00
Machine shop turn.	25.00 to	26.00
Mixed borings and turn.	15.00 to	16.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	15.00 to	16.00
Heavy breakable cast	34.00 to	35.00
Mixed cupola cast	50.00 to	51.00
Automobile cast	73.00 to	74.00
Stainless		
18-8 bundles and solids	470.00 to	480.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	39.00 to	42.00
No. 1 dealer bundles	80.00 to	83.00
No. 2 dealer bundles	37.00 to	40.00
Machine shop turn.	1.00 to	3.00
Shoveling turnings	5.00 to	8.00
Low phos. plate	76.00 to	79.00
Electric furnace bundles	71.00 to	74.00
Galvanized bundles	61.00 to	64.00

Cleveland

No. 1 hvy. melting	$ 60.00 to	$ 63.00
No. 2 hvy. melting	32.00 to	35.00
No. 1 dealer bundles	79.00 to	82.00
No. 1 factory bundles	82.00 to	85.00
No. 2 bundles	22.00 to	25.00
No. 1 busheling	79.00 to	82.00
Machine shop turn.	1.00 to	4.00
Mixed bor. and turn.	1.00 to	4.00
Shoveling turnings	3.00 to	6.00
Cast iron borings	6.00 to	9.00
Cut structural & plates, 2 ft. and under	97.00 to	100.00
Low phos. punchings plate	97.00 to	100.00
Drop forge flashings	37.00 to	40.00
Foundry steel, 2 ft. & under	57.00 to	60.00
No. 1 RR hvy melting	77.00 to	80.00
Rails, 2 ft. and under	102.00 to	105.00
Rails, 18 in. and under	103.00 to	106.00
Steel axle turnings	67.00 to	70.00
Railroad cast	80.00 to	83.00
No. 1 machinery cast	87.00 to	90.00
Cupola cast	60.00 to	63.00
Stove plate	45.00 to	48.00
Stainless		
18-8 bundles	325.00 to	335.00
18-8 turnings	275.00 to	285.00
430 bundles	80.00 to	85.00

Buffalo

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 39.00
No. 2 hvy. melting	31.00 to	32.00
No. 1 busheling	50.00 to	51.00
No. 1 dealer bundles	49.00 to	50.00
No. 2 bundles	26.00 to	27.00
Machine shop turn.	12.00 to	13.00
Mixed bor. and turn.	13.00 to	14.00
Shoveling turnings	15.00 to	16.00
Cast iron borings	12.00 to	13.00
Low phos. plate	59.00 to	60.00
Structural and plate, 2 ft. and under	58.00 to	59.00
Rails, 2 ft. and under	62.00 to	63.00
Scrap rails, random lgth.	50.00 to	51.00
No. 1 machinery cast	67.00 to	68.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 63.00 to	$ 64.00
No. 2 hvy. melting	52.00 to	53.00
Foundry steel, 2 ft.	52.00 to	53.00
No. 1 dealer bundles	63.00 to	64.00
No. 2 bundles	49.00 to	50.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	69.00 to	70.00
Rails, random length	69.00 to	70.00
Rails, 18 in. and under	84.00 to	85.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	75.00 to	76.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	92.00 to	93.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 67.00 to	$ 68.00
No. 2 heavy melting	61.00 to	62.00
No. 1 dealer bundles	67.00 to	68.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	67.00 to	68.00
Shredder scrap	81.00 to	82.00
Machine shop. turn.	24.00 to	25.00
Shoveling turnings	32.00 to	33.00
Cast iron borings	32.00 to	33.00
Electric furnace bundles	64.00 to	65.00
Elec. furnace, 3 ft. & under	61.00 to	62.00
Structural and plate, 2 ft.	85.00 to	86.00
Structural and plate, 4 ft.	81.00 to	82.00
No. 1 RR hvy. melting	67.00 to	68.00
Scrap rails, random lgth.	68.00 to	69.00
Rails, 18 in. and under	85.00 to	86.00
Angles and splice bars	82.00 to	83.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	59.00 to	60.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	55.00 to	56.00
No. 1 dealer bundles	65.00 to	66.00
No. 2 bundles	29.00 to	30.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	14.00 to	15.00
Low phos. 18 in. and under	83.00 to	84.00
Rails, random length	88.00 to	89.00
Rails, 2 ft. and under	86.00 to	87.00
No. 1 cupola cast	67.00 to	68.00
Heavy breakable cast	34.00 to	35.00
Drop broken cast	77.00 to	78.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	490.00 to	510.00
18-8 turnings	390.00 to	410.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	44.00 to	46.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	44.00 to	46.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 42.00 to	$ 44.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	13.00 to	15.00
Machine shop turn.	6.00 to	8.00
Cast iron borings	6.00 to	8.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	30.00 to	32.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 dealer bundles	10.00 to	12.00
Machine shop turn.	6.00 to	8.00
Shoveling turnings	10.00 to	12.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under (foundry)	86.00 to	88.00
No. 1 cupola cast	88.00 to	90.00

Seattle

No. 1 hvy. melting	$ 59.00 to	$ 61.00
No. 2 hvy. melting	48.00 to	50.00
No. 2 bundles	38.00 to	40.00
No. 1 cupola cast	94.00 to	96.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 55.00
No. 2 heavy melting cut 2 ft. and under	52.00
No. 1 dealer bundles	60.00
No. 2 bundles	30.00
Mixed steel scrap	34.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	25.00
Short steel turn.	28.00
Mixed bor. and turn.	15.00
Cast scrap	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 64.00 to	$ 65.00
No. 2 hvy. melting	48.00 to	50.00
No. 2 bundles	31.00 to	32.00
Machine shop turn.	18.00 to	19.00
Crushed turnings	34.00 to	36.00
Shredder scrap	64.00 to	65.00
Cut structural plate 2 ft. and under	82.00 to	85.00
Unstripped motor blocks	56.00 to	58.00
Cupola cast	71.00 to	73.00

STEEL PRICES

Codes identify Producers listed in the Key on page 65. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A.=Not available.

Billets, Blooms, Slabs
(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10, U1	$453.00
R3	$453.00
Midwest	
R3, U1, W5	$453.00
S1	$453.00
C10	$453.00
K2	$453.00
W5	$453.00
West	
B3(2)	$483.00
C6	$453.00
South	
A7	$453.00
Alloy, East	
R3, C10	$492.00
B3	$492.00
Midwest	
W8, W5, C10	$492.00
S1, U1	$492.00
R3	$492.00
West	
B3	$502.00
C6	$469.00
South	
A7	$492.00

Piling Sheet Steel
(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7	24.15
C20	22.90
W8	22.90
I3, T10, U1, N4	23.90
West	
C6	25.10
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	23.90
W8	24.15
U1	23.90
I3	23.90
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	23.90
I3	23.90
West	
U1	24.40
C6	24.15
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut II Edge—all widths, East	
B3, U1	22.05
J3	22.05
Midwest	
A7, D1	22.05
I4	21.45
S1, J3, D1	22.05
W3	22.05
N4	22.55
W5	22.05
U1	22.05
B3, G2, I3, M2, R3, G3	22.05
West	
K1	20.80
B3	24.70
South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
R7, S10, B4	29.60
P15	24.80
S7	Cmp*
U1	35.30
D1(1)	Cmp*
B4	31.55
Midwest	
G4	24.80
I4	35.30
W14	22.95
S1, J4	34.05
T4	Cmp*
*Composite pricing	
West	
U1	33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, (plus extras)*	
Midwest	
M2, G3, R3, W3, I4, J3, G2, I3	22.05
A7	22.05
S1	22.05
West	
K1	22.05
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	24.60
G4	25.80
I4	23.70
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	42.60
P15	32.10
Midwest	
I4	41.80
S1	42.30

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	22.05
J3	22.05
U1	22.05
Midwest	
A7, U1, B3, G2, G3, I3, M2, R3, W3	22.05
S1, W5, D1	22.05
J3	22.05
I4	21.15
West	
U1	21.30
K1	22.05
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2), U1	26.15
J3	26.15
Midwest	
B3, I3, G3, R3, M2, U1(2)	26.15
G2, W3, M11	26.15
I4	22.00
J3, A7	26.15
S1, W5, D1	26.15
West	
U1	26.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2), U1	28.00
Midwest	
J3, D1	28.00
I3, W5, S1	28.00
U1, A7, R3, Y1	28.00
G2, W3, M11	28.00
West	
K1	27.15
U1	28.50
South	
U1	28.00
R3	28.00
Enameling, Midwest	
A7, I3, U1, J3	27.65
S1	26.50
Long-Terne, Midwest	
W5	28.30
A7, U1	29.35
R3	29.35
†Actual weight basis	

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
B3	23.25
South	
G7	22.35

Tinplate
Electrolytic Tinplate
Single Reduced (70 lb)

East	per base box
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$26.79
U1	26.79
South	
U1	$26.29

Double Reduced (55 lb)**

Midwest	
M11 (50 lb)	$21.49
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$21.99
U1	21.99
South	
U1	$21.49

Black Plate
Single Reduced (75 lb)*

East	
B3	$24.01
Midwest	
J3	$24.01
M11	24.01
I3, U1, W5	24.01
W3	24.01
West	
K1	$24.01
U1	23.36

Double Reduced (55 lb)

East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

*70 lb—base weight extra 45¢
**50 lb—base weight extra $1.40

Bars
Carbon Steel, Hot-Rolled
(Special quality)

East	
R3, K3	25.80
R5	25.80
B3(3), J3	25.80
U1, C10	25.80
Midwest	
A7	23.95
U1, I3, I4, C20, N4	25.80
R3, T10	25.80
K2	25.80
I3	19.50*
West	
B3	25.80
C6	24.45
B3	24.70
South	
A8	20.65
A7	25.80
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
C21	21.15
J3(4), L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	31.00
M1	23.025
B4, C10	31.00
Midwest	
B5, W10, Y1, W8, R3	33.25
J3	31.00
B1	19.80
L2	30.75
N9	31.00
P3	19.85+CMS
W14	22.20
J3(3)	31.00
B5	31.25
J3	31.00
West	
B5	31.20
B5	34.90
R3	37.15
South	
B5	32.85
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10, U1	27.95
R3	27.95
J3	27.95
Midwest	
A7, U1, R3	27.95
I3, C10	27.95
I4	24.85
I3	21.00*
West	
B3	27.95
B5	18.50
C6	26.60
B3	27.10
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	37.90
M1	28.025
R4	25.65
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	34.25
Midwest	
B5, R3, C10	37.35
C2	28.275
J3, M9, W10	34.85
P3	22.75
B1	22.70
N9	34.85
L2	34.65
B5	35.10
J3	36.00
J3	34.85
West	
[illegible]	40.75
B5	35.20
B5	38.25
South	
J3	35.85
C16	28.00
B5	36.75

Plates

Carbon Steel, East	
B3(2), U1	25.75
L4	25.75
P2	25.75
J3	26.75
Midwest	
B3, R3, S1	25.75
I3	24.25
J3, A7	22.80
U1, I4	25.75
R3	26.75
West	
A7, B3, C6, O2	24.25
K1	23.50
U1	25.75
South	
R3	25.75
A7	25.75
U1	25.75
Alloy, East	
B3, J3	33.55
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	33.55
G2, G3	33.55
I4, U1	33.55
West	
B3	33.55
O2	30.55
K1	31.30
South	
A7	27.55

Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
U1	27.70
A7, R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
A7	25.95
C6	24.95

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilber B , Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelson Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities* / City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	27.23	28.98	31.18	31.63	21.61	24.68	17.33	33.40	42.10	52.60	69.58	73.19
Baltimore	28.67	28.19	35.29	37.30	24.85	28.64	19.19	36.65	55.85	59.91	69.79	78.32
Birmingham	21.92	29.13	31.27	32.10	21.48	24.36	17.14	31.75	49.31	68.90	68.16	74.43
Boston	25.11	29.68	34.62	45.11	35.11	37.52	20.95	41.20	48.40	52.69	62.29	67.33
Buffalo	28.09	34.26	38.88	42.37	33.04	28.77	17.80	41.10	39.03	48.82	56.33	64.06
Chicago	23.30	32.19	34.80	33.75	23.87	26.21	15.94	32.66	37.01	42.32	50.07	56.70
Cincinnati	24.85	29.72	33.23	34.55	24.63	28.78	15.20	30.51	35.17	40.02	45.20	51.15
Cleveland	27.47	32.64	33.35	33.08	25.73	26.01	16.01	32.92	35.76	41.57	46.44	52.48
Denver	33.10	40.58	37.46	41.88	34.45	35.59	21.42	41.66	51.78	59.12	67.82	70.99
Detroit	25.06	31.96	32.35	36.92	27.28	34.81	19.47	38.44	35.65	39.68	56.96	51.26
Houston	33.42	31.40	34.58	41.97	32.24	38.36	17.85	39.48	39.28	45.22	53.75	60.10
Kansas City	25.26	31.98	34.70	30.64	27.34	28.84	17.57	34.14	40.72	51.71	57.20	64.82
Los Angeles	28.33	33.68	35.61	44.73	36.10	35.90	32.26	46.36	61.48	66.52	75.05	88.80
Memphis	28.23	36.53	36.43	36.92	27.28	34.81	19.47	38.44	52.82	56.96	67.85	77.44
Milwaukee	24.20	31.40	33.85	32.90	24.56	28.00	15.71	33.04	35.61	41.88	46.30	53.45
New York	24.20	30.17	33.20	43.39	29.93	33.54	19.89	42.13	46.59	53.04	62.17	69.31
Philadelphia	28.39	35.11	36.92	46.96	30.88	36.97	19.70	39.64	46.41	52.66	62.06	69.23
Pittsburgh	26.55	32.66	35.16	41.38	32.45	29.51	20.41	41.30	46.51	54.05	61.11	68.88
Portland	28.64	37.02	40.05	31.11	31.04	35.30	32.60	53.96	61.00	64.10	78.49	....
San Francisco	28.75	35.79	37.06	41.13	35.37	35.72	29.03	48.02	57.61	69.41	77.07	84.10
Seattle	27.74	33.94	36.56	42.00	29.35	31.37	29.55	50.60	63.37	71.57	76.28	87.67
Spokane	21.00	30.34	34.28	37.91	33.00	33.75	21.60	43.01	43.20	47.52	....	58.32
St. Louis	25.28	31.06	33.30	35.96	27.25	29.68	16.09	33.14	38.46	43.65	51.02	57.48
St. Paul	24.77	30.26	33.05	35.73	26.33	28.12	15.45	34.33	36.60	41.88	46.58	53.31

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ¾-2^{15}/$_{16}$; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1⅛" round; Cold drawn—1" round; Hot-rolled 4140—1⅛" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

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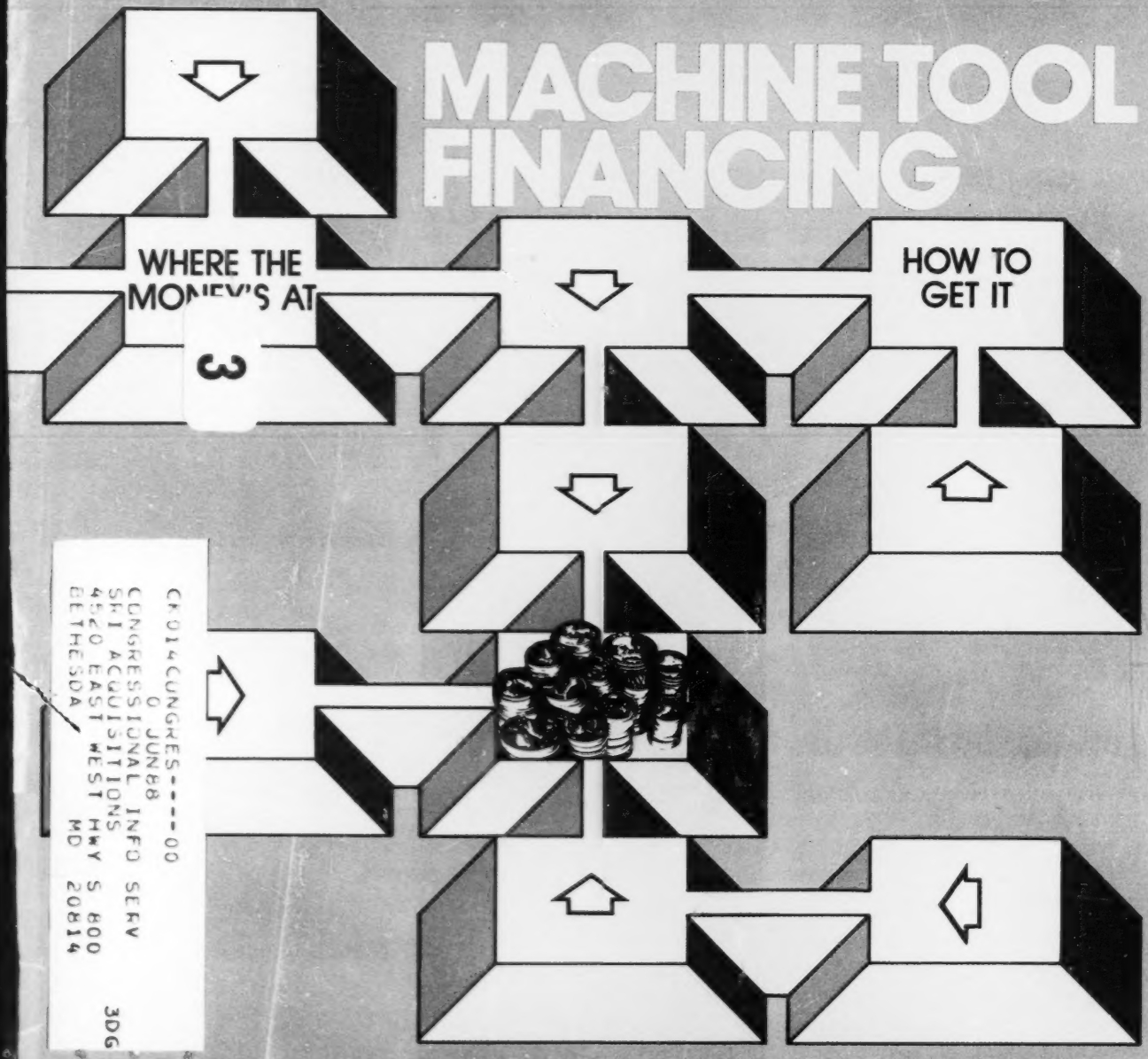
Chilton's
AUGUST 19, 1983

IRON AGE

THE MAGAZINE FOR METALWORKING MANAGEMENT



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MANUFACTURING SYSTEMS SERIES 43: DOD'S NOT-SO-MEAN FIGHTING MACHINE

QUALITY IN AMERICA—PART III IN A SERIES: QUALITY CONTROL BY THE NUMBERS

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PLUS: NEW MACHINE TOOL PRODUCT REVIEW

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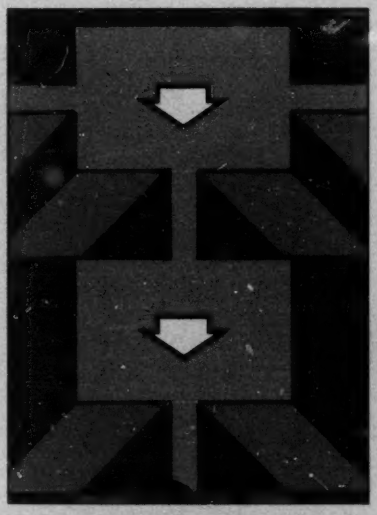

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THE WAR BETWEEN THE STATES FOR HIGH TECHNOLOGY

War among the states for hi-tech industry.

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METALWORKING ORDER TRENDS

Defense contracts break loose and give boost to new orders

At first glance, the overall orders figures for June looked great.

But a closer look showed that the orders picture was good, but not great. Too much of the big dollar volume increase during the month was attributable to defense industry orders. These are very volatile from month-to-month; they just can't be counted on for growth continuity.

Orders received by durable goods producers in June totaled $89.9 billion. This was up $5.1 billion, or 6.0 pct, over the May volume. It was the heftiest monthly increase since January's 8.1 pct gain.

The bulge was in transportation equipment. These orders increased by $4.7 billion, or 25.0 pct, over May. Noted U.S. Commerce Dept. analysts, "Over three fourths of the transportation equipment increase was for defense orders for aircraft, aircraft parts and shipbuilding."

If defense industry orders are excluded, the monthly increase for durables new orders comes out to a modest $1.6 billion, or 2.0 pct.

As noted on the table here, the defense orders bulge shows up in three breakouts of overall orders—in defense industry capital goods, in the transportatioon equipment industry group and in that group's sub-head —aircraft, missiles and parts.

Closely-watched nondefense capital goods orders rose $1.0 billion, or 4.3 pct, to $23.3 billion in June. And here, the rise was centered almost entirely in orders going to commercial aircraft producers and to the computing equipment industries.

Notably, orders going to machinery producers in June—both electrical and nonelectrical—showed declines. These weren't big declines, but they do point to continuing softness in capital goods lines.

So, it appears that the long-awaited resurgence in capital goods lines is not signaled by the June orders data. Capital goods order gains were too heavily centered in defense lines, and gains in nondefense capital goods orders had only a narrow support base.

One good sign for future metalworking business activity was seen in June data on inventories. Stocks held by durable goods producers fell by $1.1 billion. Except for small increases in April and May, inventories have been going down since November 1981. Now, the inventory-paring is going on in just about all durable goods industries.

Source: U.S. Dept. of Commerce Billions of dollars, seasonally adjusted monthly total, unless otherwise noted		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
Capital Expenditures (Annual Rates)				
U.S. Industry, Total	2nd Qtr.	$302.2*	$302.3	$323.2
Manufacturing, Total	2nd Qtr.	111.3*	112.8	123.8
Manufacturing, Durable Goods	2nd Qtr.	50.9*	52.8	59.0
Mining Industry	2nd Qtr.	14.6*	14.6	16.6
Key Indicators, Durable Goods Manufacturing				
New Orders	June	89.9	84.8	73.0
Shipments	June	85.9	83.0	77.3
Inventories	June	169.6	170.7	181.5
Unfilled Orders	June	305.0	301.1	296.8
New Orders, Metalworking				
Capital Goods Producers, Nondefense Industries	June	23.3	22.3	18.7
Capital Goods Producers, Defense Industries	June	8.3	4.8	5.7
Primary Metals, Total	June	9.8	10.0	8.3
Steel (SIC 331)	June	3.8	4.2	3.6
Iron & Steel Castings (SIC 332)	June	1.1	1.1	0.7
Nonferrous Metals	June	4.9	4.7	4.0
Nonelectrical Mach.-Equip. Industries, Total	June	14.7	15.0	12.6
Engines & Turbines	June	0.8	1.2	0.9
Farm Machinery & Equipment (Shipments)	June	0.9	0.9	0.8
Construction, Mining & Materials Hdlg. Equip.	June	2.5	2.5	2.2
General Industrial Machinery	June	1.1	1.1	1.1
Fluid Power Equipment** (Index-1972=100)	June	253	223	199
Metalworking Machinery	June	0.6	0.7	0.7
Machine Tools, Total (Millions $, unadjusted)***	June	145.3	135.3	125.9
Machine Tools, Metal-Cutting***	June	96.5	93.6	91.7
Machine Tools, Metal-Forming***	June	48.8	41.7	34.2
Electrical Mach. & Equip. Industries, Total	June	13.7	13.8	11.8
Elec. Transmission Equip. & Industrial Apparatus	June	1.9	1.5	1.6
Household Appliances	June	1.2	1.3	1.1
Communication Equipment	June	4.8	4.3	4.1
Transportation Equip. Industrial, Total	June	23.3	18.6	16.2
Motor Vehicles & Parts (Shipments)	June	12.9	12.3	10.8
Aircraft, Missiles & Parts	June	8.4	4.3	5.1
Shipbuilding & Military Tanks	June	1.2	1.2	0.4
Fabricated Metal Products, Total	June	10.3	10.0	9.0
Instruments, Total	June	4.2	4.0	4.1

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA.

STILL NO HINT OF A REBOUND IN STEEL/NONFERROUS PROFITS

Steel slips again; nonferrous results are mixed in second quarter.

BY GEORGE J. MCMANUS AND ROBERT J. REGAN

Steel

The steel industry lost another half billion dollars in the second quarter of 1983.

That brought to more than $4 billion the industry's loss since the start of 1982.

The second quarter was a particularly bad time. Estimated shipments of 17 million tons were up 6 pct from the second quarter of 1982 and 11 pct from the first quarter of 1983.

The mills had the full benefit of wage reductions that took effect March 1. There has been strenuous cost cutting throughout the industry.

Nevertheless, the seven largest mills had a combined loss of $516 million in the second quarter. That compared with $275 million in the second quarter of 1982.

The basic problem was continued weak demand. Steel shipments were up from the lows of 1982, but they still weren't good. In what is normally the peak quarter of the year, the mills shipped at an annual rate of only 68 million tons.

What really killed the industry, though, was price cutting. "The competitive pressure in prices is more severe than a year ago . . .," said Inland Steel Co.

The mills are now trying to achieve a degree of price stability. There is said to be general support for the higher prices on sheets and bars. Increases were announced for these products in February, but the mills were never able to collect the new prices.

Prices appear "to have bottomed out for most of our products," says John B. McKinney, president of Laclede Steel Co. Laclede's products include bars and rods.

As far as volume is concerned, no big upturn is in sight. July turned out to be a typical July.

August isn't looking much better and the early automotive orders for September are disappointing.

The weakness of the capital goods sector continues to depress plates, structurals and tubular products.

There are some bright spots in the steel picture. Laclede Steel went from a loss of $1.9 million in the second quarter of 1982 to a profit of $1.4 million in the second quarter of 1983. Laclede went from a loss of $5 million in last year's first half to a profit of nearly $2.8 million in the first six months of 1983.

Nucor Corp. continues to go its profitable way. Nucor's $4.8 million profit in the second quarter was up 71 pct from the second quarter of 1982.

National Steel Corp. had a net loss of $99 million, but most of this was due to an additional $100 million write-off on the proposed sale of Weirton Steel to employees.

On its operations, National had a profit of $800,000. Particularly impressive was an operating profit of more than $9 million on steelmaking. This was the first profit on steel since the third quarter of 1981.

United States Steel Corp. had a net loss of $112 million in the second quarter. That compared with a $4 million profit in the second quarter of 1982. U. S. Steel's operating profit of $163 million in the second quarter represented a $369 million improvement over the first quarter operating loss.

From Marathon Oil, U. S. Steel had an operating profit of $290 million before foreign income taxes. The corporation's interest charges, which largely reflected the Marathon acquisition, fell from $264 million in the second quarter of 1982 to $208 million in the second quarter of 1983.

Bethlehem Steel Corp. lost $92.7 million in the second quarter. That was down from $175 million in the first quarter of 1983, but up from $47 million in the second quarter of 1982.

Bethlehem is primarily a steel company and its dollar sales provide a rough measure of what has been happening to steel prices.

The company's dollar sales were down 16 pct from the second quarter of 1982 although its tonnage shipped was up slightly.

Like Bethlehem, Republic Steel Corp. shipped more tons in the second quarter, but took in fewer dollars than in the second quarter of 1982.

The company's net loss of $45 million in the second quarter compared with $85 million in the second quarter of 1982 and $35 million in the first quarter of 1983. Excluding the effects of accounting and other adjustments, Republic did better in the recent quarter than in earlier periods.

Inland Steel had a net loss of $29.7 million in the second quarter. This was mildly disappointing. Inland was the one large steel company which earlier had been given a shot at making money in the second quarter.

Inland's comments on the market outlook were more bullish than those of other producers. The company "continues to experience strong demand for cold-rolled and coated sheet products, with orders extending through the third quarter and beyond."

Inland also reported "a rising trend in orders for bars, structurals, and plate products . . ."

Nonferrous

Results were mixed for the nonferrous metals industries in the second quarter of 1983—making the period something of a mixed blessing when compared with a dismal first quarter and a wretched second quarter of 1982.

Most of the improvement showed up in the sales column and the sprinkling of profits gainers was augmented by a few cases where losses were smaller this time around.

Many key metals-consuming industries did well in the second quarter, including the automotive, appliance, nonfood retail and aerospace industries, which suggests that better things are in store for the metal producers in the second half of the year—interest rate trends permitting. In the same vein, the beverage industry showed smart gains in the second quarter, but the benefit didn't extend to the container manufacturers in the same period.

The aluminum industry, which has a big stake in the beverage container business, moved up in the sales and shipments columns, but Aluminum Co. of America was the only gainer on the profits side. Alcan's small profit was down from the same 1982 period and both Reynolds and Kaiser Aluminum spilled more red ink this time around. Alcoa cited higher prices for ingot and some mill products, moderation of labor

Still No Rebound for Steel . . .

Millions of Dollars		Earnings			Sales		
	E/S Pct	2nd Qtr. '83	2nd Qtr. '82	Pct Change	2nd Qtr. '83	2nd Qtr. '82	Pct Change
USS	—	(112.00)	4.00	—	4,363.00	5,100.00	−14.0
Bethlehem	—	(92.70)	(47.10)	—	1,234.60	1,470.50	−16.0
Armco	—	(75.80)	(57.40)	—	1,079.90	1,464.50	−26.0
National	—	(99.17)	(48.02)	—	752.14	787.77	−4.5
Republic	—	(45.41)	(85.26)	—	666.33	744.87	−11.0
Inland	—	(29.74)	(23.21)	—	773.41	743.65	+4.0
LTV	—	(61.30)	(18.80)	—	993.70	1,286.50	−22.0
Total	—	(516.12)	(275.79)	—	9,862.18	11,577.79	−15.0
Wheel.-Pgh.	—	(18.89)	(13.17)	—	191.57	187.39	+2.2
CF&I	—	(14.67)	(5.91)	—	56.93	97.02	−41.0
Copperweld	—	(12.37)	0.90	—	79.98	101.25	−21.0
Lukens	—	(3.33)	1.15	—	87.27	97.91	−11.0
Florida	—	(0.76)	(0.91)	—	61.52	58.79	+4.6
Laclede	—	1.41	(1.94)	—	45.56	43.67	+4.3
Nucor	3.8	4.84	2.83	+71	127.61	124.49	+2.5
Quanex	—	(0.25)	1.64	—	74.63	102.86	−27.0
Interlake	1.7	3.60	1.00	+260	206.00	198.20	−3.9
Cyclops	—	(0.45)	0.42	—	243.20	227.71	+ 6.8
Carpenter	8.6	9.70	9.70	—	112.40	122.50	+8.2

. . . And Nonferrous Is Not Much Better

Millions of Dollars	Earnings			Sales and Other Revenue		
	2nd Qtr. '83	2nd Qtr. '82	Pct Change	2nd Qtr. '83	2nd Qtr. '82	Pct Change
Alcan	3.0	5.0	−40.0	1,329.0	1,193.0	+ 11.3
Alcoa	34.6	15.1	+129.1	1,257.9	1,239.5	+ 1.5
Amax	(21.2)	(42.7)	—	567.8	621.9	− 8.7
Asarco	27.6	(24.8)	—	380.3	331.7	+ 14.7
Brush Wellman	6.3	4.6	+37.0	60.5	51.6	+ 17.2
Cabot Corp.	14.1	24.6	−42.7	389.0	404.6	− 3.8
Callahan Mining	0.9	(0.7)	—	6.3	3.5	+ 80.0
Cominco	(3.7)	18.1	—	413.5	385.0	+ 7.4
Engelhard	18.0	16.3	+10.4	617.0	447.4	+ 37.8
Falconbridge Ltd.	(7.3)	(16.2)	—	180.8	145.1	+ 24.6
Hecla Mining	9.9	(3.3)	—	24.8	10.6	+134.0
Homestake Mining	9.9	2.7	+266.7	64.8	48.5	+ 33.6
Inco	(39.7)	(36.9)	—	284.0	357.0	− 20.4
Kaiser Aluminum	(51.3)	(30.0)	—	782.0	840.2	− 6.9
Martin Marietta	57.0	40.2	+41.8	953.5	909.7	+ 4.8
Noranda Mines	9.2	(57.1)	—	795.1	749.1	+ 6.9
Olin	24.0	23.4	+2.6	490.3	474.2	+ 3.3
Phelps Dodge	0.3	(19.4)	—	282.1	263.2	+ 7.2
Revere Copper & Brass	2.8	(14.2)	—	119.0	166.4	− 28.4
Reynolds Metals	(69.1)	25.5	—	853.4	807.8	+ 5.6
Vulcan Materials	15.4	18.7	−17.6	199.9	187.7	+ 6.4
Wolverine Aluminum	1.1	0.3	+266.7	22.7	18.2	+ 24.7

( ) denotes loss

Brush Wellman: Net for 1982 quarter is after $212,000 loss from discontinued operations. **Cominco:** Canadian funds. Net for 1982 period is after $18.1 million extraordinary credit from sale of oil and gas properties. **Falconbridge Ltd.:** Canadian Funds. **Hecla Mining:** Net for 1983 period includes $3.4 million tax-loss carryforward. **Martin Marietta Corp.:** Net for the 1983 quarter includes pre-tax gain of $67 million from sale of assets. **Noranda Mines:** Canadian funds. **Reynolds Metals:** Net loss for 1983 period includes a $52.7 million charge for scheduled plant closings. Net income for the 1982 period includes an extraordinary $4.6 million gain from exchange of common stock for debentures.

costs and lower energy costs for a 129 pct gain in second quarter profits, which still left it with an after-tax rate of return of about 2.7 pct.

The aluminum producers managed to pare down heavy inventories in the first half of the year. Production started curving upward in the second quarter, in response to temporary cuts in power rates in the Pacific Northwest in some cases, but industry officials have indicated they see no return to inventory accumulation as long as demand continues to improve.

Reynolds Metals' $69.1 million net loss included a $52.7 million charge for estimated cost of writeoffs associated with planned closings of "several uneconomic production facilities." It is believed that at least one of two Reynolds smelters is earmarked for shutdown—some sources have predicted that two will be closed—which will put a sizable dent in domestic primary aluminum capacity as the recovery progresses.

Copper prices have improved, though not as dramatically as aluminum prices, since the start of the year. Asarco Inc. and Phelps Dodge Corp. were helped to varying degrees by this, with Phelps Dodge edging into the black after five consecutive quarterly net losses. The company's major copper units didn't resume production until May 2, after having been shut down for more than a year.

Asarco credited its improved results to better prices and sales of copper and silver, plus lower operating and overhead costs and the shutdown and sale of money-losing properties and investments. Asarco said it was maintaining a conservative view of prospects for the balance of the year.

The consumer-led recovery to date has yet to reach down to the capital goods sector, which leaves the nickel producers with more of a wait than most of the other nonferrous producers.

Inco Ltd.'s nickel deliveries increased about 15 pct, compared with the second quarter of 1983, but copper, silver, cobalt and platinum group shipments were down sharply because of production shutdowns.

Falconbridge Ltd. cut its loss by more than half on a 24.6 pct rise in sales.

The lagging capital goods sector slowed recovery for Amax Inc.'s molybdenum, nickel, tungsten and specialty metals units. Its aluminum earnings were up and the copper, lead, zinc and precious metals division broke even. □

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MACHINE TOOL FINANCING— WHERE THE MONEY'S AT, AND HOW YOU CAN GET IT

BY GEORGE A. WEIMER

"Pride of ownership used to be a machine tool user's motto. Equity was considered a far higher priority in machine shops than it is today judging from financing trends in the industry. Leasing for example, has grown from a very little part of the business a few decades ago to a very significant part of the machine tool industry today. Part of this growth is obviously a matter of the far higher prices for modern computer numerical control (CNC) equipment today compared to the simpler lathes of decades past. Part is also due to the far higher level of financial sophistication in the industry and the new financial tools banks as well as manufacturers offer. All these factors have moved much of the machine shop world from the "pride of ownership" to the "price of use."

In some cases, leasing has even allowed people to enter the machining business with very little personal capital.

Jack Hooper was an instructor at a trade school in Nashville. With $2,500 each, he and several partners, and a DoAll machine tool lease plan, now own and operate Hooper Mfg. with $23 million in sales annually.

The machine shop world has moved from 'pride of ownership' to the 'price of use'

The vital elements of the operation were the ability of beginning machinists to quickly master high precision work and the DoAll Leasing Program that gave the fledgling shop the equipment it needed to get started.

"All were essential, but the DoAll Leasing Program was the indispensable key. It put me in business; without it, I'd still be a $10,000-a-year vo-tech instructor," says Mr. Hooper.

Mr. Hooper says that the difference between a bank lease program and a manufacturer's lease program is "DoAll knows what a machine tool can do."

"I was sure financing would be no problem. On that score, however, I was wrong. All we had was a solid product idea—no track record, no credit lines, and no one among the bankers we approached knew anything about machining. We could get lines of credit for operating needs, but not for equipment," says Mr. Hooper.

"We reserve our banker for cash flow requirements. We don't want to use up all of our credit on machines, then have to scramble to meet the short-term needs that pop up from time to time in every operation," he says.

A major advantage of leasing, says George Drost, assistant general counsel of DoAll is that the customer has immediate use of the equipment while he's making payments.

The trends show our sales will be for larger, more sophisticated equipment at prices substantially higher than obtained in our traditional markets. The enormous technological changes of the past few years have led to other changes in the way in which financing is done. Because of the far greater amounts of money involved, we have an arrangement with an outside financing company.

Some banks don't understand the machine tool business, he believes. The customer may have some special aspects for financing that would not be acceptable to a bank. "In many cases, we can accommodate him," says Mr.

TRENDS IN EQUIPMENT LEASES

	(Millions of Dollars)				Pct. Annual Growth		
					Historic	Projected	
ITEM	1967	1981	1985	1990	67/81	81/85	85/90
Equipment Sales	53650	216390	308000	516000	10.5	9.2	10.9
Pct. Leased	17.3	18.4	19.8	20.5	—	—	—
New Equipment Leases	9281	39855	61115	105990	11.0	11.3	11.6
By Type:							
Capital Leases	4595	23421	37195	66035	12.3	12.3	12.2
Operating Leases	4686	16434	23920	39955	9.4	9.8	10.8
By Lessor:							
Manufacturers' Leases	3243	8000	11955	21420	6.7	10.6	12.4
Third Party Leases	6038	31855	49160	84570	12.6	11.5	11.5
Leasing Companies	5133	26110	38465	64875	12.3	10.2	11.0
Banks	905	5745	10695	19695	14.1	16.8	13.0

Source: Predicasts, Inc.

MACHINE TOOLS

ITEM	1967	1972	1977	1981	1985	1990
	Millions of Dollars					
Equipment Sales,	1430	1900	2500	3200	4700	7500
Pct. Leased	2.1	3.7	5.8	6.1	8.0	9.0
Equipment Leases	30	70	145	195	375	675
By Type:						
Capital Leases	29	68	142	192	370	665
Operating Leases	1	2	3	3	5	10
By Lessor:						
Manufacturers' Leases	3	10	20	25	60	100
Third Party Leases:	27	60	125	170	315	575
Leasing Companies	27	60	125	170	315	575
Banks	—	—	—	neg	neg	neg
Net Equipment in Place,	9300	14300	16300	25100	36000	54000
Pct. Leased	.9	1.3	3.0	3.0	3.4	5.2
Net Leases in Place	80	185	490	765	1225	2800
Capital Leases	8	180	480	750	1200	2750
Operating Leases	2	5	10	15	25	50

Source: Predicasts, Inc.

Drost.

"The big advantage is to be able to move the customer into a tailor-made financial plan where he's paying an affordable monthly amount and is able to use a machine that provided a good income. Whatever the interest rate happens to be at any given time, the decision to finance boils down to how much money the equipment can make against the cost," says Mr. Drost.

"We have to be creative in the ways we use money. We are not bankers. We are in the financing business to sell metalworking equipment. To do that, we have to take the role of financier and create methods to get capital goods into the hands of users during these difficult financial times," he says.

And, many banks are betting that the capital goods leasing business is a growth industry. Some seem to have, in just a few short years, learned a great deal about machine tools.

Whatever doubts they might express about the ability of the machine tool industry in the United States to respond to the challenge of overseas competition, everyone from the CEO's of both domestic and overseas machine tool manufacturers, to security analysts, corporate planners and consultants, believes that long term, the worldwide market for machine tools will prove enormous. "Indeed, the elements supporting this optimistic outlook are so varied that, even should one or two of them not materialize, the others should provide plenty of forward momentum," a source at Citicorp Industrial Credit says.

Purchasers of new equipment will soon find that the Reagan Administration's new tax policies give them considerably more financial leverage. The new rules establish a shorter write-off period for new plant and equipment, and will tend to increase cash flow and the rate of return on capital expenditures, the bank source says.

A Standard & Poor's survey of trends in the machine tool industry concludes that "by thus decreasing the minimum rate of return, the criteria for investment have been eased, and an affirmative capital spending decision made more likely in many cases."

Industry observers agree that, while its effects have been limited by the recession, the tax legislation provides solid incentives for manufacturers to upgrade their existing machine tool stock with new equipment. These incentives have certainly been a major factor behind recent new purchases.

Financing or leasing new equipment should contribute to, not detract from, the achievement of a firm's basic financial objectives, as well as meet the need for increased productivity. The key point, in other words, is that purchasing or leasing a new piece of equipment has strategic implications that can be very advantageous over the long term, but will vary with each financing structure and corporate situation.

How does Citicorp Industrial Credit evaluate machine tool companies for credit? In much the same way that management looks at its own operations. Cash flow is important, of course, but so is business potential, as well as financial history. But perhaps the most important consideration for the financing firm, and thus for the lender, is the machine being financed: its anticipated life span, its potential for obsolescence, long-term as well as short.

So it's to a borrower's obvious advantage to choose financing from a firm thoroughly familiar with the machine tool industry, the borrower's own business, and the particular piece of machinery being acquired.

The advantages of financing alternatives will become even more important as CNC equipment becomes a more prominent element in businesses' challenge to increase productivity. While the new equipment does that, and does it very well indeed, the initial investment can be substantial, either for a small machine shop purchasing a $100,000 CNC turret lathe, or for a major automobile manufacturer buying a $6 million automated assembly plant. How can such an investment be made and at the same time improve a business's important financial indicators, like return on investment? In acquiring such equipment, how can a business take maximum advantage of investment tax credit and depreciation allowances, while reducing the impact on cash flow?

Because of the high cost of the new technology, such questions, whether or not they result in equipment financing, will probably become as important as acquiring basic machine tool equipment as the technical specifications of the equipment itself, Citicorp believes.

What are the ways? Citicorp outlines the basic financial tools available.

First is basic equipment financing, the classic form of leveraging a new equipment purchase, also referred to as a 'capital lease.' With little or no cash outlay, equipment users acquire productive assets. The lessor loans up to 100 percent of the equipment's purchase price, while the lessee retains all tax benefits and ownership interest. A constant payout, coupled with flexible terms, five to seven years is typical, but up to 10 years is possible, makes this a popular form of financing in the machine tool industry.

Given volatile interest rates, a firm will want to preserve the maximum degree of flexibility in whatever financing vehicle is chosen.

Some companies offer borrowers a float and fix option on their lease, whereby a borrower may float the cost of the lease at an increment over prime

for a period up to one year and fix the rate any time during the period for the remaining term. In capital leases, the equipment is listed as an asset, and lease payments as offsetting liabilities an important consideration for some firms.

Then there is an operating lease. This is not really a form of financing but rather a pure lease; in effect, a rental. The user operates the equipment for a specified period of time, at a cost of less than full purchase price, but never takes title.

A major strategic consideration with operating leases is that they are off balance sheet: the lessee's rental payments are shown as an operating expense, and the equipment is not capitalized on the user's balance sheet.

Typically, operating leases are drawn only for smaller ticket items with strong residual values, since the lessor ends up as the owner at the end of the lease period.

Major benefits to the user? The company has use of the equipment required for a specified purpose over a designated period of time, usually two to three years. Because they don't pay the full amount of the equipment's original cost, a user can preserve the cash for higher yielding investments.

And there's vendor leasing. In this form of financing, a third party, typically a finance company, serves as an intermediary between an equipment manufacturer, the vendor, and the user. From the manufacturer's point of view, the appeal is obvious, another party handles all the details of financing, specifically documentation, billing, collections and funding.

The manufacturer's capital requirements are reduced, and cash flow is accelerated. Vendor leasing provides manufacturers with a method of offering price reduction through financing by subsidizing their rates in lieu of discounting equipment cost. Tax and ownership benefits are retained by the manufacturer or by the third party financer. For the user, the major benefits are convenience and assured financing at a specific rate.

And there's tax leasing which is primarily used to finance large capital assets. Tax benefits are retained by the

CINCINNATI MILACRON PLANS

EXAMPLE

1. Machine base list price (exclusive of local sales tax and shipping)	$98.850
2. Down payment (minimum 10%)	9,885
3. Balance to finance (line 1 less line 2)	88,965
4. Interest on balance (line 3) at 7½% under '83 SUMMER SPECIAL plan*	18,911
5. Total cost over life of deferred payment plan (line 3 plus line 4)	107,876
6. First monthly payment (180 days after shipment of machine)	2,780
7. Subsequent regular monthly payments (54)	1,946
First Year Cost Computation:	
8. Out of pocket costs:	
a. Down payment (line 2)	9,885
b. Monthly payments first year (line 7 x 5 plus line 6)	12,510
c. TOTAL	22,395
9. Available tax benefits:	
a. Investment tax credit, 8% option (line 1 x .08)	7,908
b. Depreciation tax reduction, assuming 50% tax bracket (line 1 x 15% x 50%)	7,414
c. Interest-paid tax reduction assuming 50% tax bracket	2,736
d. TOTAL	18,058
10. NET FIRST YEAR OUT-OF-POCKET COST. (line 8c less line 9d)	4,337
Cost Per Hour in One-Shift Operation (line 9 ÷ 2000 hrs.)	$2.17
Cost Per Hour in Two-Shift Operation (line 9 ÷ 4000 hrs.)	$1.09

WATERBURY FARREL-TEXTRON PLANS

Plan A—Five-Year Conditional Sales Contract Deferred Payment Plan

1. 10 pct down-due before shipment-on standard machine, accessories and tooling.
2. 50 pct down on all special tooling and/or accessories-due before shipment.
3. Customer also pays freight and any applicable state sales tax.
4. Five-year financing (56 payments) with first payment due five months after date of shipment.
5. Monthly payment—$25.20 per $1,000.00 financed.
6. Full investment tax credit passed to customer.
7. No prepayment penalty.
8. Simple interest rate—13.4 pct per annum.

Plan B—Three Years Conditional Sales Contract 11.25% Interest

1. 10 pct down-due before shipment-on standard machine, accessories and tooling.
2. 50 pct down on all special tooling and/or accessories-due before shipment.
3. Customer also pays freight and any applicable state sales tax.
4. Three year financing (36 payments) with first payment due one month after date of shipment.
5. Monthly payment—$32.86 per $1,000.00 financed.
6. Full investment tax credit passed to customer.
7. No prepayment penalty.
8. Simple interest rate at 11.25 pct per annum.

Plan C—Five Years Operating Lease Program

1. Advance rental—5 months (to be applied against last 5 payments).
2. Lease factors:
   a) ITC* retained by Textron—$17.76 per $1,000.00 selling price.
   b) ITC* passed to customer—$20.41 per $1,000.00 selling price.

Note: Above Finance Plans apply to single machine orders. For large projects or systems which may involve special tooling, contact National Sales Manager.

Subject to credit approval.

Plans and rates will remain in effect for an unspecified period of time. Waterbury Farrel reserves the right to make changes but not during the life of any contract.

*Investment tax credit.

Acme-Cleveland Corp.
Profitpac—Financing & Leasing Plans

Examples—$150,000 Lease Transaction—Plans A-C
Examples—$150,000 Conditional Sales Contract—Plans D-F

PLAN A—Effective Interest Rate 13.78 Pct
4 years—no payments first 3 months

1st thru 3rd payments	$ -0-
4th thru 48th payments	$ 4,387.50
Purchase option	$ 1.00
1st year cost	$39,487.50
Avg. cost per hour (over 4 years)	$ 19.74*
Monthly payment factor	.02925

PLAN B—Effective Interest Rate 13.78 Pct
6 years—no payments first 3 months

1st thru 3rd payments	$ -0-
4th thru 72nd payments	$ 3,232.50
Purchase option	$ 1.00
1st year cost	$29,092.50
Avg. cost per hour (over 6 years)	$ 14.87*
Monthly payment factor	.02155

PLAN C—Effective Interest Rate 13.78 Pct
8 years

1st payment (Factor .05000)	$ 7,400.00
2nd thru 96th payments	$ 2,472.00
Purchase option	$ 1.00
1st year cost	$34,692.00
Avg. cost per hour (over 8 years)	$ 12.12*
Payment factor 95 months	.01648

A floating interest rate plan with a 5 pct downpayment is also available. Principal payments are fixed. Interest charged is 1¼ pct over prime floating daily.

PLAN D—Effective Interest Rate 12.5 Pct
3 years

1st thru 36th payments	$ 4,966.31
1st year cost	$59,595.71
Avg. cost per hour (over 3 years)	$ 23.84*
Monthly payment factor	.0331087

PLAN E—Effective Interest Rate 13 Pct
5 years

1st thru 60th payments	$ 3,376.38
1st year cost	$40,516.56
Avg. cost per hour (over 5 years)	$ 16.21*
Monthly payment factor	.0225092

PLAN F—Effective Interest Rate 14 Pct
7 years

1st thru 8th payments	$ 2,778.59
1st year cost	$33,343.08
Avg. cost per hour (over 7 years)	$ 13.34*
Monthly payment factor	.0185239

- No downpayment required.
- No payment option for 3 months on 4 and 6 year plans.
- Competitive interest rates.
- Interest fixed at time of shipment—Plans A-C.
- Interest fixed at time of credit approval—Plans D-F.
- No prepayment penalty. (Rule of 78's applies to early termination).
- Interest rates are subject to change without notice.

*Based on 2,500 hours per year. Cost per hour can be further reduced by taking into consideration the investment tax credit of 10 pct and the tax deductions for the lease payments or depreciation.

owner/lessor; the result is a lower financing rate for the equipment user.

Most of the large scale benefits of the safe harbor leasing provisions of the Economic Recovery Tax Act of 1981 were eliminated in recent legislation.

The same legislation offered a "window of opportunity" for firms that placed orders for new equipment prior to July 2, 1982, and expected to take delivery before the end of the year.

While 1983 will be a transition year; the new Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) creates brand new opportunities for "finance" lease structuring that will apply, generally, to leases entered into after 1983. As a result of TEFRA, from 1984 on, tax leasing should become a more attractive means of financing since it allows both below-market rate financing and also caps residual value, Citicorp points out.

A wide variety of special features can be structured , into any of these financing alternatives. When considering these alternatives, borrowers should focus heavily on flexibility of terms, the key benefit to machine tool manufacturers, dealers and end users, Citicorp Industrial Credit advise.

Adds Stanley A. Harris, vice-president and program manager, machine tools, Citicorp Industrial credit, "this is relatively new for the bank. The machine tool business has never been traditionally a big leasing business." One reason, he says for the trend is the very high cost of new equipment.

How does Citicorp evaluate a potential new customer for leasing arrangements? "At least 4 years in business. Twenty or more employees. A profitable track record. And we look at his company compared to his peers," Mr. Harris says.

Richard W. Crannell, assistant vice-president, Citicorp Industrial Credit, adds that another development in leasing will come with the TEFRA-spawned finance lease with fixed prices and purchase options. This begins in January of 1984.

"Many of the large manufacturers are already clients of the bank and we feel it's part of our job to bring our resources to bear. We bring all the traditional tools." But he adds, if the corporate tax rate drops significantly, it does not bode well for leasing.

The business of machine tool leasing has others in banking and financing interested as well. General Electric Corp., Litton Industries Inc., and numerous other companies have developed very sophisticated approaches to the financing of capital equipment. However, it's often the builders who are the customers' first money call.

Dan R. McCullough, vice-president, industrial financing, Textron Financial Corp., Providence, R.I. adds, "As far as I know, we are the only full service captive financial organization in the U.S. We have a $400 million receivables portfolio with $20 million in machine tools."

What about TEFRA? TEFRA does make some significant changes in terms of lease law. "It will make leasing significantly more popular in the machine tool industry," Mr. McCullough says.

Mr. McCullough also says the Japanese "consignment" approach is making American lessors' lines exceedingly difficult.

Several other large machine tool companies have captive financial organizations as well.

Bendix Automation Group for exam-

DOALL FINANCING PLANS

30-60-90 DAY CONTRACT

1. A contract is signed by both parties with machine title passing on final payment.
2. Customer pays 1/3 down at time of ordering.
3. The remaining 2/3 is divided by 3 and is paid in 30, 60, and 90 days after machine delivery with no interest or carrying charges.

12, 18 or 24 MONTH CONDITIONAL SALES CONTRACT

1. A contract is signed by both parties with machine title passing on final payment.
2. Customer pays 1/3 down at time of ordering.
3. The balance of 2/3 is computed with 8% add-on interest (16%—simple) and spread over the contract period for monthly payments.

3-YEAR LEASE PLAN WITH PURCHASE OPTION

1. A contract is signed by both parties.
2. The purchase price is divided by six.
3. The customer pays 1/6 of the machine price every six months for three years with the first payment made as the down payment at the time of order placement.
4. At the end of three years (six payments) the customer may then lease at a rate of 10% per year of purchase price.
5. If the customer chooses to consider the purchase option, it may be used at the end of the first year or any six-month period thereafter.
6. 75% of all amounts paid in the first three years apply to the machine purchase.

ASSOCIATES CONDITIONAL SALES CONTRACT THROUGH DOALL

1. For machines at $30,000 and more.
2. A contract is signed by both parties with machine title passing on final payment.
3. A 10% down payment is made at time of ordering.
4. Balance is financed at 14% simple interest over five years.

ple, and its predecessor companies have been providing customer financing for about 25 years. "Recently, we both expanded our financial capacity and developed several new programs," says Frederick W. Searby, president, Bendix Automation.

Like all captive finance companies, Bendix Finance Corp. is "a complement to our ongoing and aggressive sales efforts. It works closely with our operating units to develop programs and plans that will meet the many and varied cash flow and other needs of our current and prospective customers, and respond to changing economic, legislative, and competitive influences," says Mr. Searby.

Bendix Finance is its own profit center, to be sure. But contrary to independent lenders, its primary charge is to "help put the productivity of our machines, systems, and other products to work for the current and prospective and our operating units," says Mr. Searby.

"We hope that Bendix Finance is recognized by our customers for its flexibility, in plans and programs as well as in terms. It offers leasing and financing and choices of fixed or fluctuating rates, for example. In short, because it strives to remain in tune to ever-changing economic, legislative, and competitive trends and influences, it consistently tailors plans and programs to virtually all sizes and types of companies," Mr. Searby says.

Traditionally, leasing has been the thrust of Bendix Finance business, with either fixed or fluctuating rates, no downpayment, fixed monthly payments, and purchase options.

Offering a return option and terms for five years, Bendix Finance Corporation's leasing plans have always sought "to minimize cash flow uncertainties associated with equipment acquisition. They have protected customers from inflation, allowing them to make future payments with tomorrow's cheaper dollars, and they have helped protect them from equipment obsolescence," he notes.

"Our customers have often chosen the option of purchasing their leased equipment at the end of their lease term, however, because of the equipment's inherent and enduring performance, precision, and reliability characteristics."

Bendix also now offers financing designed to allow companies to preserve their working capital while enjoying all of the tax benefits of equipment ownership from the Investment Tax Credit to depreciation, financing offers a choice of "balloon" or reverse downpayments and correspondingly low monthly payments.

This program includes fixed rate and fluctuating rate plans with a competitive, and in some cases below market, annual percentage rate. Terms are normally for five years. Contrary to traditional financing arrangements, the "balloon" for final lump sum payment of up to 25 pct of the equipment cost has replaced an initial downpayment. The larger the "balloon," the smaller the customer's payment each month, Mr. Searby explains.

Other financial tools include promotional financing, a vehicle for moving inventory and stimulating sales by offering customers below market interest rates, is one example. Another example is a unique equipment rental program currently being offered in conjunction with certain operating units in the Bendix Automation Group.

Applied to selected used machines currently in stock and available for quick delivery, the program allows customers to realize significant productivity improvements while limiting their obligation to as few as six but not more than 12 months, Mr. Searby says.

The program's monthly payments are a small fraction of the equipment's purchase price, and customers are allowed to apply 100% of those payments to the purchase of their equipment at a later date. Bendix Finance may even quote additional financing as required to assist customers to purchase the equipment at the end of their rental terms, Mr. Searby says.

Another very useful financing tool for capital goods, particularly for projects of $10 million or less is the use of Industrial Revenue Bonds (IRB's), says A. C. McDaniel, president, Hill Acme Corp., Cleveland. "This is a device good for both process machinery and buildings. An IRB approach is good for anything that lasts 10 years or longer." Approximately 7 to 13 years is the life of an IRB loan.

What's so special about the IRB approach? "It costs less, generally 25 to 30 pct. less than floating prime," says Mr. McDaniel.

There are also definite repayment plans. It's not like borrowing from a bank. It's not a callable loan.

IRB's are aimed at small and medium sized companies. "It's a carrot provided by the IRS," says Mr. McDaniel.

Financing, particularly leasing in its several forms, is a particularly useful tool to upgrade your customers' technical base, add various experts.

"I can't overemphasize the impor-

tance of having a good financial outlet and maintaining an excellent working arrangement" says George W. Fels, treasurer, LeBlond Makino Machine Tool Company, Cincinnati, Ohio. "In today's machine tool market, delivery is a critical item. There's an overabundance of supply and you just don't have the luxury of allowing for the normal processing time. The third day after a customer signs an application for a stock machine, he expects an approval and an imminent delivery. Therein lies the real benefit of having a good financial outlet which is flexible, responsive, and aggressive enough to meet your needs. Three days turn around time, when the application is complete with financial statements, has become the norm rather than the exception. The financing documents are sent to the customer by overnight delivery the same day that approval is given, and very often are returned and filed before arrival of the machine at the customer's plant."

In the last 10 months, transactions under Makino LeBlond's financing plan have accounted for approximately 15 pct. of total sales. Over 70 pct. of the sales financed are stock machines from our small product lines which sell from $12,000 to $14,000 each. "Financing has been a successful tool at getting our machines into the small and developing businesses who wanted our product but couldn't amass the capital to pay net 30 day terms. This way they can make their payments out of cash flow generated by the equipment. Without financing, these developing businesses would have been limited to used or second-hand products.

"This is the obvious and expected conclusion of refinancing and assisting of new customers coming into the market. The real surprise, is that it's the only real assist we can give our manual machine customers, to get up over the financial hurdle and move on to CNC equipment. The real savings and productivity increases are at the CNC level and the sooner owners of manual equipment get up to that level, the sooner they'll be able to experience tremendous returns over their prior level of performance. The price differential between manual and CNC equipment has been the real hurdle. Customers who have bought manual LeBlond Makino machines in the past were reluctant to make that next logical step-up to CNC because of the price differential. Financing has now given us a way to overcome that hurdle. Customers who have manual LeBlond Makino equipment in house, and now are moving up to CNC, account for approximately 20 pct. of our financed sales. The last remaining 10 pct. of our financed sales are customers who already have and are familiar with CNC, and have sufficient financial strength to pay according to terms, but chose to finance the purchase rather than part with their precious cash," says Mr. Fels.

"As a final caveat," he adds, "caution must be exercised in formulating a plan to insure that new sales are, in fact, generated. Otherwise, all that's been accomplished is an erosion of your profit margin."

Years ago, it was pride of ownership. Common sense and uncommonly high prices for more and more common high tech tools have changed the machine shop world.

The annual sales volume of most machine shops was, and still is, under $5 million. Most began, and remain, family-owned operations. In the past, such shops financed purchase of new equipment through cash reserves or other internal means, an accepted practice for equipment with an expected life of 30 years or more.

"The introduction of numerically controlled (NC) and direct numerically controlled (DNC) equipment has radi-

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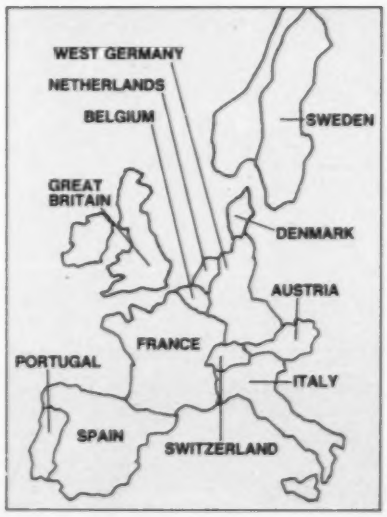

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cally changed the picture," says Thomas C. Morrison, vice president, Barclays American/Business Credit, Inc. "While these processes were first introduced more than 25 years ago, they are just now becoming affordable to smaller firms. And most forward-looking shops recognize that new equipment is the key to increasing productivity by speeding processes, improving quality and reducing labor costs.

"Even shops which have maintained profit margins and made moderate capital outlays must radically alter financing patterns if they are to survive and continue profitable operations."

A recent banking study indicates that a small to medium shop, with sales between $1 and $10 million, will run out of cash, increase leverage and face serious problems getting cash for day-to-day operations if receivables slow even slightly in response to the rising interest rates. "To compound the situation, the price of equipment rises rapidly in an inflationary period, and increased costs reflect negatively on margins and cash flow," says Mr. Morrison.

Clearly, shops which had traditionally made capital expenditures from cash reserves or financed only a portion of their equipment purchases will now turn to outside financing from business lenders. This approach serves not only to effect equipment purchases but also helps to preserve working capital.

"Offering a variety of financial services, business financing allows the machine shop owner to realize the value of existing assets through secured loans on accounts receivable, inventory, plant and equipment. Such loans are particularly suited to this capital-intensive industry, where assets frequently include older machinery. Business financing, in most situations, can relieve profit margin strain by refinancing existing equipment and improving productivity and quality through the purchase of modern equipment," says Mr. Morrison.

The approach is practical. "Fixed assets, such as existing equipment, tend to retain value and can generate funds by serving as collateral for a loan. This cash can be used to update existing machinery or purchase new tape-driven equipment. This demand, coupled with the exceptionally long life of machine tools, serves to support values."

To-be-purchased equipment can also serve as collateral for a loan. In fact, lenders will sometimes finance new equipment with no down payment.

Another secured lending tool frequently used by machine shops is accounts receivalbe financing.

"This financing method allows outstanding accounts, particularly slow paying ones, to generate immediate cash which can be used profitably elsewhere.

"Inventory loans normally accompany accounts receivable financing and allow shops to better match selling and production cycles which may be seasonal, cyclical or dependent upon the award of government and other contracts," Mr. Morrison says.

In many cases, secured lending arrangements can be shared with a bank. In such an arrangement, everybody benefits, with the borrower receiving needed funds at a "blended" rate.

Finally, the future of machine tool leasing and similar financing is projected to grow faster than the industry itself predicts Dr. John Breckling, senior analyst, Predicasts, Inc.

"In most cases, the reason for leasing is a consequence of the character of the end-use market, which resembles the construction field and other areas where relatively small companies are typical."

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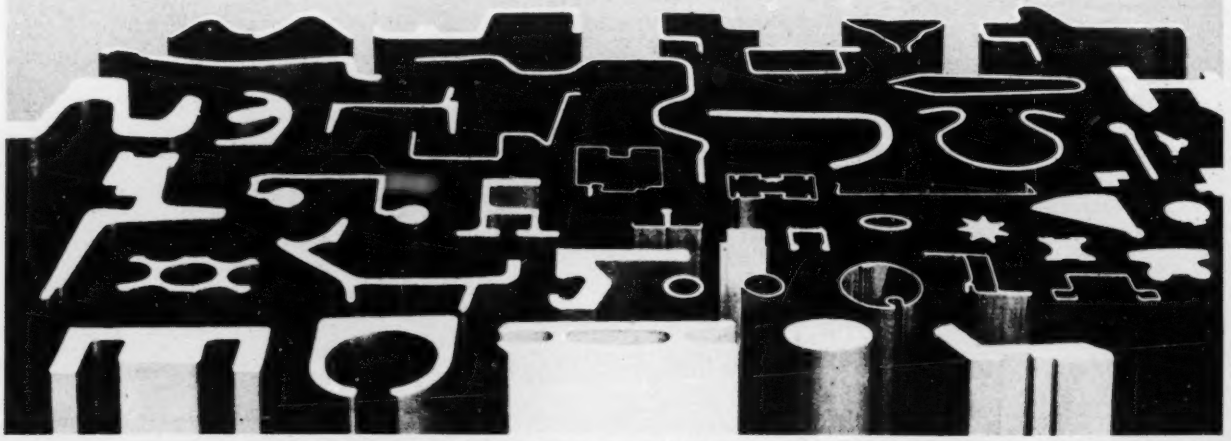

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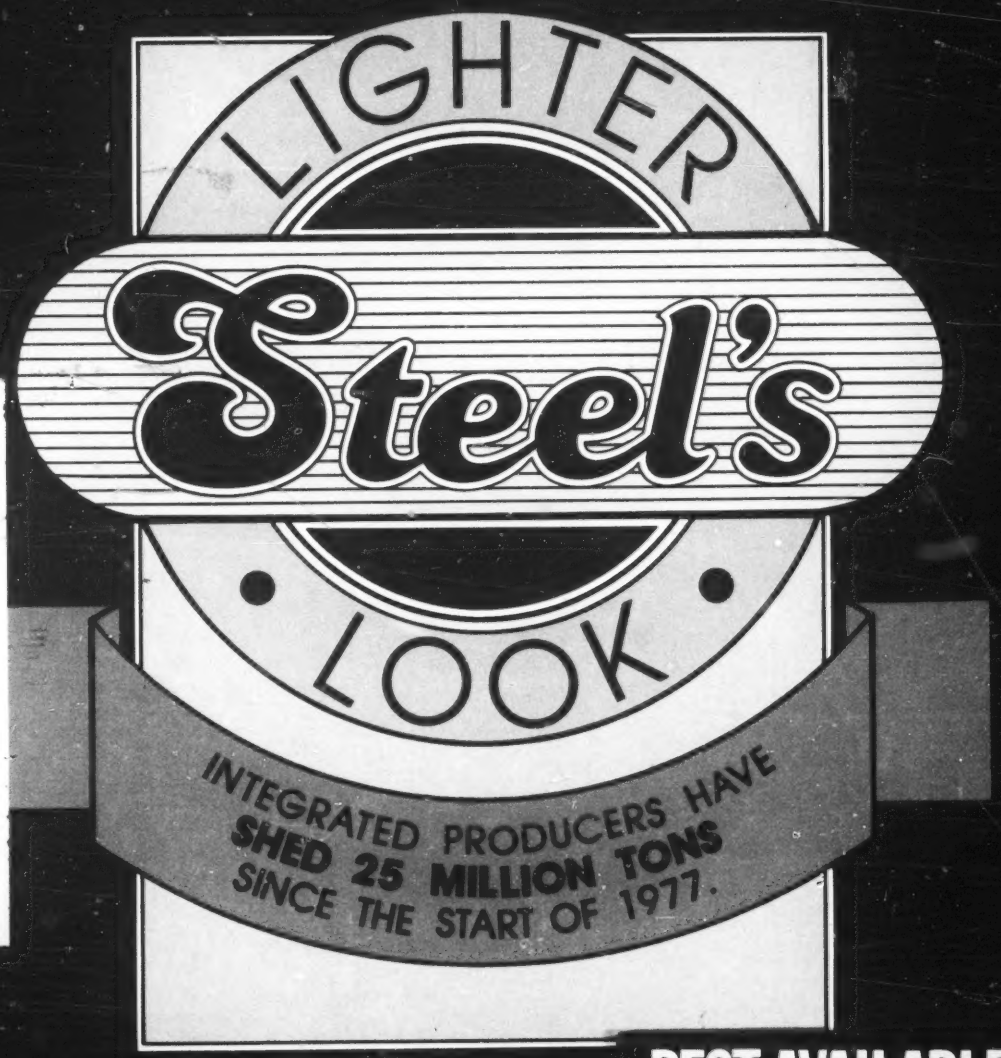

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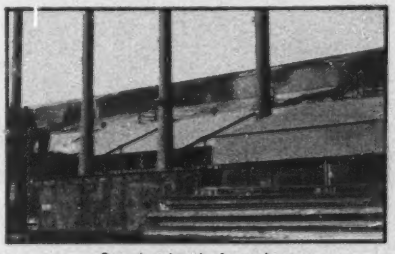

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COMMERCE SEES GROWTH IN SPECIALTY STEEL IN DECADE AHEAD

Prospects for overall demand remain dim. Growth rates will remain at no more than 1 to 1.2 pct. per year-the same rate as the 1970s.

BY EDWIN W. BOWERS

Everyone knows, as the U.S. government says "steel is clearly essential to national security and economic well being." And everyone it seems is seeking the answer to the question: What lies ahead for the domestic steel industry?

A U.S. Commerce Department task force has assessed prospects for the industry including the outlook for its critical raw materials. Demand for steel in the '80s, the panel says, will increase by no more than 1 to 1.2 pct. per year—the same growth rate as the 1970s. At the same time steel shipments are predicted to range from lows of 90 million to 94 million tons, to as high as 104 million to 108 million tons.

Also, the 12-member group forecasts a trend in steel production toward specialty or alloy steels. In addition, although the panel sees the industry's increasing dependence on foreigners for alloying raw materials, it does not see the U.S. vulnerable to supply disruptions across-the-board. "The vulnerability of the industry to disruptions in supply of alloying materials varies with commodity," the group concludes. The study looks critically at nickel, chromium, manganese, tungsten, molybdenum, and silicon.

It says the U.S. is considered vulnerable to a disruption in manganese supplies but not so, for example, in the case of molybdenum. Supplies of chromium, it says, "are expected to be at the most serious risk because of high import dependence, potentially unstable supply sources, questionable stockpile inventories and lack of cost effective substitutes." Although the U.S. will continue to import 70 pct or more of its primary nickel supplies, Commerce says, they should be readily available from a diversity of exporting countries. Also readily available will be tungsten concentrates, according to the survey, although "import dependence is expected to continue and, perhaps, increase through 1990."

The evaluation continues: "domestic ferrosilicon production capacity should remain at adequate levels to meet essential U.S. needs in an emergency."

"We consider this assessment of the various industries useful," says George Watson, President, the Ferroalloys Association, "but flawed. The government sees import supplies in terms of accessibility in the event of an international crisis and not in terms of how much imports are affecting our domestic industries. We disagree with their conclusions on the silicon business: that it is stable and it is going to be healthy—it is not. It's being beat to hell by imports.

"The level of domestic steel output is also influenced by its cost competitiveness with foreign producers," says Ralph Thompson, of Commerce's Bureau of Industrial Economics (BIE). "Determinants of international competitiveness include labor costs and productivity, energy efficiency, capacity use, regulatory and materials costs. While the U.S. steel industry is generally competitive in energy and materials costs and use, it is less competitive in terms of labor costs and productivity vis-a-vis foreign producers."

Obviously how the steel industry grows will be among the major factors governing requirements for ferroalloys and other alloying metals.

"The production of alloy steel, including high-strength, low-alloy (HSLA)," the government says, "is projected as increasing from 11 pct of total shipments in 1980 to about 13 pct in 1990. Stainless steel is also expected to increase its share of steel output, from 1.3 pct. in 1980 to 1.6 pct. in 1990. The tool steel share of total steel shipments should remain at about the same level throughout the decade. As a per-

STEEL INDUSTRY FERROALLOY REQUIREMENTS (BASE CASE)

(thousands of tons)

	1980	1982	PROJECTED 1986	1990
Ferrochromium	227,996	163,140	244,711	255,587
Ferromanganese	766,266	548,295	822,443	858,996
Silicomanganese	139,790	100,025	150,038	156,707
Ferrosilicon	268,684	192,255	288,382	301,199
Ferrotungsten	226	162	243	253
Ferronickel	27,872	19,950	29,925	31,255
Ferrocolumbium	2,295	1,642	2,463	2,573
Ferrovanadium	5,217	3,733	5,599	5,848
Ferromolybdenum	2,141	1,532	2,298	2,400
(HIGH CASE)				
Ferrochromium	227,996	163,140	282,777	293,653
Ferromanganese	766,266	548,295	950,378	986,931
Silicomanganese	139,790	100,025	173,378	180,046
Ferrosilicon	268,684	192,255	333,241	346,058
Ferrotungsten	226	162	280	290
Ferronickel	27,872	19,950	34,569	35,910
Ferrocolumbium	2,295	1,642	2,846	2,956
Ferrovanadium	5,217	3,733	6,470	6,719
Ferromolybdenum	2,141	1,532	2,655	2,758

Source: U.S. Commerce Dept.

cent of steel shipments, carbon steel is expected to decline from 87 pct. in 1980 to about 85 pct. by 1990.

More than 90 pct. of the U.S. consumption of manganese goes into steel. The U.S. depends on imports for almost all of its manganese ore and about 77 pct. of its ferromanganese requirements. It is import dependent for an even higher percentage of its high carbon ferromanganese. The Commerce group sees consumption going up by only 0.4 pct. between now and 1990, a general decline in unit usage. "It seems reasonable to predict that manganese usage per ton of steel will decline by about 4 pct by 1986 and 7 pct by 1990." This is the result, they say, of lower carbon steel production and increased use of external desulfurization and continuous casting. The Ferroalloys Association disagrees. "We just don't think that's realistic," says Mr. Watson.

In Commerce's low-case projection, steel industry demand for primary chromium is projected to 256,000 tons by 1990. Ferrochromium requirements are put at 294,000 tons in seven years. Stainless and heat resisting steels should make up 1.5 pct. of total steel shipments by 1986 and about 1.6 pct. by 1990.

Indications are that world reserves of chromite are quite large in comparison to current rates of use. And there are enormous quantities of resources available for future development. Supplies should be sufficient to meet demand well into the next century, the Commerce group says. Since mining capacity is currently about 13 million short tons per year, well above present world mine output, adequate capacity would seem to be assured over the next five to 10 years, they conclude. (Cont. on p. 33)

STEEL INDUSTRY SHIPMENTS (BASE CASE)

(thousands of tons)

			PROJECTED	
	1980	1982	1986	1990
Semifinished	5,342	3,408	5,040	5,295
Rods, Bar, & Wire	17,714	10,772	17,371	18,076
Flat Rolled	39,304	32,236	46,711	48,607
Pipe and Tube	9,097	5,026	8,190	8,523
All Other	12,396	8,341	12,688	13,499
Total	83,853	59,783	90,000	94,000
	(HIGH CASE)			
Semifinished	5,342	3,408	5,827	6,064
Rods, Bar, & Wire	17,714	10,772	20,084	20,900
Flat Rolled	39,304	32,236	54,007	56,200
Pipe and Tube	9,097	5,026	9,469	9,853
All Other	12,396	8,341	14,613	14,983
Total	83,853	59,783	104,000	108,000

Source: U.S. Commerce Dept.

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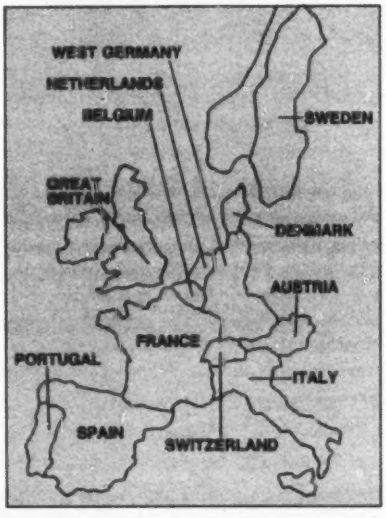

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But, Commerce says, the increasing reliance of the major industrial nations, including the U.S., on imported ferrochromium may result in decreased flexibility and increased vulnerability of supply on the part of steel producers.

The world's largest consumer of processed nickel—the U.S.—has very little processing capacity of its own and, according to BIEs Graylin Presbury, "is dependent on imports for its supply of processed nickel." The Hanna Mining Co. produces some ferronickel as does AMAX; the latter firm uses imported raw materials. U.S. nickel reserves are rated "small" at 360,000 tons of ore containing between 3,000 and 5,000 tons of nickel. World nickel reserves are conservatively estimated at 60 million tons of ore. The U.S. consumes annually about 23 pct of the world's output.

According to Commerce, steel industry demand for primary nickel is expected to increase at the same growth rate as overall steel output. The production of stainless and heat-resisting steels is expected to be about 1.6 pct. of overall steel output by 1990. Demand for nickel in superalloys will probably be the fastest growing application for nickel and overall nickel demand is expected to increase 2.2 pct. per year through 1990. This comes out—on the low side—to an average annual increase of about 530 tons, reaching 49,100 tons in seven years. Ferronickel requirements under those conditions would be about 31,000 tons in 1990, an average annual increase of 340 tons.

Should steel industry shipments range more to the high side estimate averaging a 2.6 pct. annual increase, nickel consumption could go as high as 56,400 tons by 1990. Ferronickel use would jump to 35,900 tons averaging about 800 tons annually.

"Future prospects for adequate supplies of nickel are bright since enormous nickel reserves have been identified around the world," says Commerce's Robert Wilson, chairman of the task force.

America's northern neighbor is included among America's leading sources of ferrosilicon products along with Iceland, Norway and Brazil. But Mr. Watson says the domestic industry is "hanging on by its teeth as Canada, Venezuela, Brazil and Iceland gear up to invade the U.S. market."

The Commerce Department says "while U.S. production capacity for silicon metal is expected to increase over the next decade, production capacity for ferrosilicon may decline owing to increased power costs, decreased production of other ferroalloys and import competition." Says Mr. Wilson: "More furnaces may be shut down if the import competition continues at the present price differentials." Nevertheless, the government panel says "domestic ferrosilicon production capacity should remain at adequate levels to meet essential U.S. needs in an emergency."

It is known that deposits of silicon-bearing raw materials are widespread throughout the U.S. and the world. Deposits are more than sufficient to sustain the ferrosilicon and silicon metals industry indefinitely at current production rates, says the U.S. Bureau of Mines.

About 37 pct. of U.S. consumption of silicon goes for steel. Commerce says requirements are expected to increase at an annual rate of 3 pct. as increased alloy steel production, use of continuous casting and other factors lead to greater demand for the alloy. In the study group's base case, overall steel industry requirements for silicon increase from 193,000 tons in 1982 to 303,000 tons in 1990 and in its high case—based on higher levels of steel production—silicon requirements increase to 348,000 tons in 1990.

Paradoxically, Commerce says U.S.

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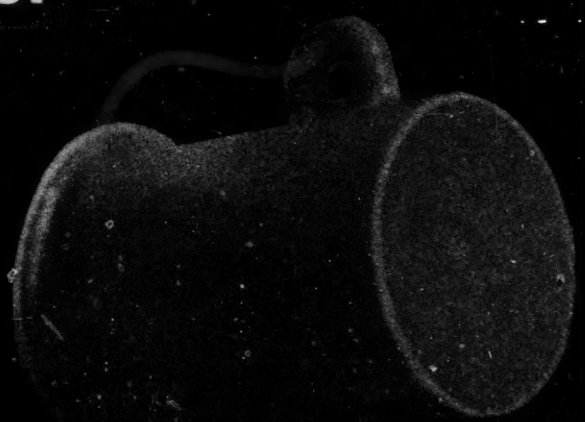

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production capacity for silicon metal is expected to increase over the next decade yet it might decline for ferrosilicon because of increased power costs, import competition and decreased production of other ferroalloys. Nevertheless, it says, domestic ferrosilicon production capacity should remain at adequate levels to meet an emergency.

Supplies of tungsten concentrates—although the U.S. is totally dependent on imports—should also be sufficient to 1990, says James Kennedy. "There has been a slight downward trend in the amount of tungsten consumed per ton of tool steel shipped," he observes.

In Commerce's "base case" projection, U.S. requirements for tungsten three years hence are projected to be 783 tons compared with 729 tons three years ago. The figure is expected to rise to 817 tons in 1990, an average annual increase of nine tons. Based on higher levels of steel production over the years, U.S. tungsten needs could be as high as 904 tons in 1986 progressing to 938 tons three years later.

Although the U.S. has the world's largest tungsten processing industry, domestic production is insufficient to meet demand for tungsten concentrates, says Mr. Kennedy. Currently the U.S. imports about 54 pct. of its consumption of tungsten concentrates. Thus, import dependence is expected to continue and, possibly, increase through this decade.

Right now stockpile levels of chromium, and nickel, among others, are below governmentally established goals. There is no stockpile goal for ferrosilicon and stocks of tungsten and manganese are above the government's goals.

"The United States is the only country incapable of meeting its domestic steel needs with domestic production," says Rep. Joseph Gaydos (D., Pa.) a member of the Congressional Steel Caucus. "Between 1977 and 1981 the U.S. lost 12.5 million tons of steelmaking capacity and may wind up losing at least that much again between now and several years hence. Once you lose capacity it is gone forever. It is too difficult to get back."

Rep. Nick Rahall (D. WVa.) cites the book, "World Steel in 1980," written by Fr. William I. Hogan in which Rev. Hogan says "this country is the objective of virtually every steel producing country in the world. It is open where others are not. They design their steel capacity with exports to this country in mind."

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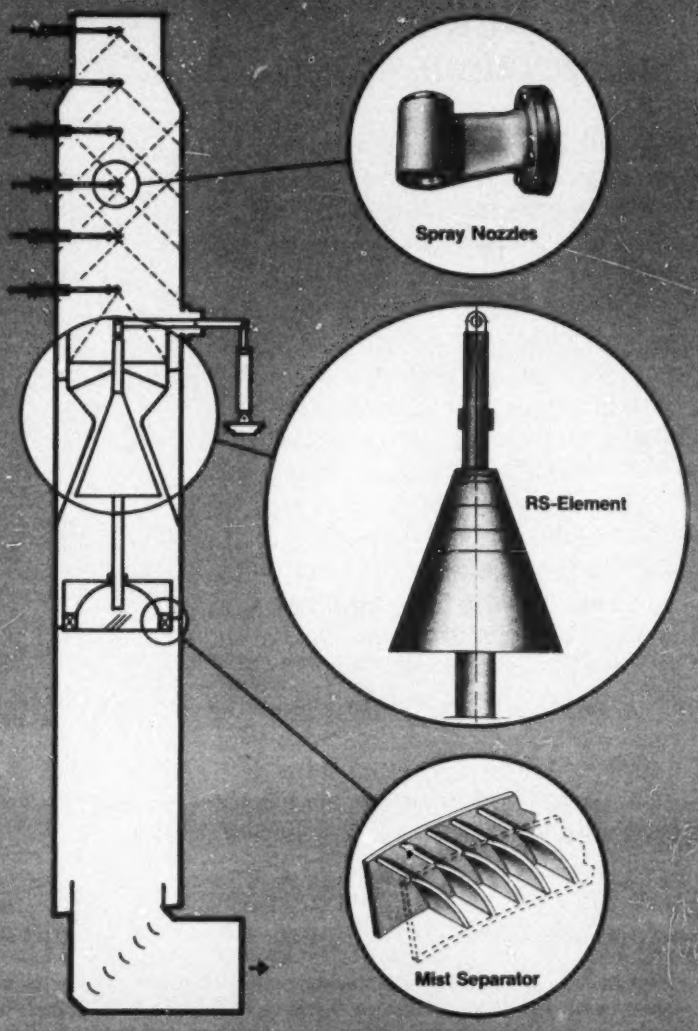

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METALWORKING ORDER TRENDS

Prices continue to play a cool, cool tune

Producer prices in July went from cool to cooler. Prices for finished goods rose 0.1 pct from June levels. This increase was smaller than those of 0.3 pct in May and 0.5 pct in June.

Most of the price slowdown was due to a sharp easing off in energy prices. In July, energy prices rose a slim 0.2 pct following much larger advances in May and June.

Finished goods prices for the 12-month period since last July were up 1.4 pct. In May, this annual rate came to 2.3 pct, and in June it was 1.8 pct.

Notably, going right along with the price cooling in finished goods, capital equipment tags also came down in their rate of advance. In July, capital equipment prices rose 0.1 pct compared to increases of twice that in May and June.

The average price advance in July for the key 22 metalworking products listed on the table here was a bit less than 0.9 pct.

If sustained over a year's time, the annual rate increase for the metalworking lines would come to 2.2 pct.

It could well be that producer prices will be soon firming up prior to a possibly mild upturn in the early fall. This is likely because the economy spurted so strongly in the second quarter (real GNP up 9.2 pct).

Too, consumers have been buying big-tag items like cars and appliances at a fast clip. Consumers took on more installment credit in June than for any month since the government began keeping track in 1943.

Predictably, this demand-side pressure will catch up with producer prices before long. The delay fuse on a price blowup has been the great slack that remains in the economy following the severe 1981-82 recession.

A scan of the table here shows that cool prices prevail across the spectrum of metalworking products. The only unusual rise was in electric motors. That rise was due in part to the U.S. Labor Department's inclusion of generators and generator sets with engines in July for the first time.

A firming of prices in the months ahead is a good omen, not a bad one, for metalworking. After all, firming prices would mean the business recovery was continuing on course.

Notably, prices in the general economy rose from 3.4 pct to 4.4 pct in the second quarter. But GNP still went from a 2.6 pct annual rise rate to a 9.2 pct rate.

Latest Month Covered: July, 1983

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	377.0	− 0.3	+ 2.0
Metal Forming Machine Tools	416.2	+ 0.1	+ 1.3
Agricultural Machinery & Equip.	326.2	+ 0.2	+ 4.9
Construction Machinery & Equip.	352.7	+ 0.1	+ 1.9
Industrial Process Furnace & Ovens	361.7	+ 0.1	+ 2.0
Industrial Material Handling Equip.	284.8	− 0.1	− 0.7
Pumps, Compressors & Allied Equip.	347.7	+ 0.1	0
Fluid Power Equip. (Dec. 1970 = 100)	253.5	0	+ 3.1
Mechanical Power Transmission Equip.	315.0	− 0.2	− 0.1
Automobiles	217.5	0	+ 1.8
Motor Trucks—Light	269.5	− 0.3	+ 0.9
Motor Trucks—Heavy	313.5	+ 0.2	NA
Railroad Equipment	358.1	+ 0.4	+ 4.5
Fabricated Metal Structural Products	302.2	+ 0.1	− 0.6
Electric Motors	330.7	+ 2.6	+ 7.6
Valves (Metal, Ex-Fluid Power—Dec. 1982=100)	99.9	− 0.3	NA
Ball & Roller Bearings	330.9	+ 0.1	− 0.9
Cutting Tools & Accessories	275.4	− 0.3	+ 0.8
Heating Equipment	244.0	+ 0.6	+ 2.1
Plumbing Fixtures & Brass Fittings	292.1	+ 0.5	+ 3.1
Metal Containers	337.4	+ 0.2	+ 2.2
Miscellaneous Metal Products	287.4	0	+ 1.5

Data based on U.S. Labor Dept.'s Producer Price Index

50 PCT OF TODAY'S CAR IS STEEL.

TOMORROW?

Aluminum and plastics are posing a challenge. Pontiac's Fiero and Dodge's Mini Ram Van use material which could loosen steel's grip.

BY BRYAN H. BERRY

Three new vehicles are breakthroughs in automotive aluminum, plastic and steel. The 1984 Chevrolet Corvette uses weight—saving aluminum forgings and castings for diverse structural parts that usually are iron or steel. The 1984 Pontiac Fiero, which debuts next week, proves that plastic can match the surface appearance of steel. The 1984 Dodge Mini Ram Van due this winter uses 1½-side galvanized steel for all exterior panels except the roof; it should resist corrosion for ten years.

The fledgling plastics industry is cutting the cycle time, thickness, and cost of the sheet-molding compound (SMC) and reinforced reaction-injection-molded (RRIM) compounds used on the automotive body skin. The entrenched steel industry continues to lose exterior body panels to plastics but still accounts for 55 to 60 pct of the dry weight of the average vehicle. The aluminum industry is proving more successful at capturing structural parts inside the car than body panels outside. The bumper, however, is providing good business for all three industries.

"Whenever a car design calls for hang-on body panels that don't provide the structural integrity," says Stuart P. Keeler, staff applications specialist, product applications center, National Steel Group, "all the sheet steel used for the automotive skin is vulnerable to plastics."

Both the Corvette and the Fiero use plastic body panels fixed to a steel structural frame, or "birdcage." How widely will this concept be used? How do the plastics, steel and aluminum used on exterior body panels compare in manufacturing and cost? How are the makers of these materials improving them to suit the car better?

"If you're talking strictly economics and forgetting everything else," says James K. Reinker, manager, advanced automotive development, chemicals/plastics/industrial products group, General Tire and Rubber Co., "your first choice is going to be steel. No ifs, ands, or buts about that."

The raw material cost of plain carbon steel is 30 or 40¢ per pound. Coated steels cost more.

Both aluminum and plastics cost $1 or more per pound. A primed, processed SMC component on a car assembly costs $1.75 or $2 per pound, estimates Mr. Reinker.

Area is a better measure of cost. Here steel has the lowest cost per square foot, says William J. Riffe, coordinator, high-strength steel sheets, U.S. Steel Corp. "Plastics are five to seven times more expensive than steel," says Julius J. Harwood, director, material sciences laboratory, Ford engineering and research staff. "Steel costs 25¢ per lb. Plastics and aluminum cost $1.30 or $1.40."

"Plastic competed head-to-head with aluminum," says Mr. Reinker, "for GM's Z28 hood. GM selected SMC over aluminum strictly on the basis of cost."

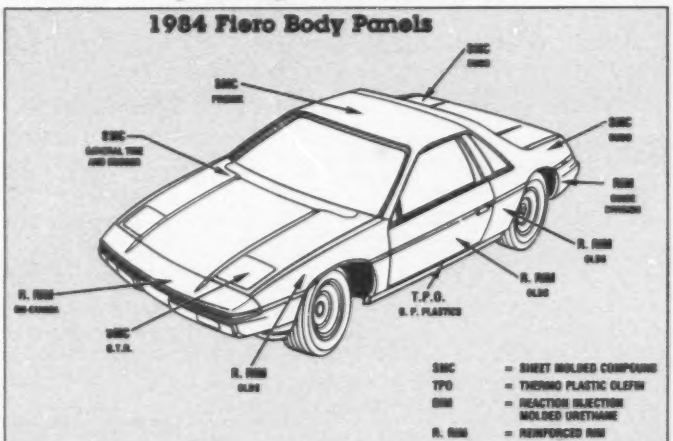
"Today's automotive market," emphasizes Mr. Harwood of Ford, "is very conscious of cost. Whatever benefits any material gives, it can't impose a cost penalty on us. I don't see how we can compete any better with the Japanese by putting aluminum on our exterior panels."

Aluminum's not *that* expensive, protests Arthur S. Kasper, automotive technical director, Reynolds Metals. Wrought aluminum sheet costs 1.9 times more than steel, he says; 1.5 times more than galvanized steel; and 1.3 times more if you consider that aluminum weighs less than steel and can be recycled completely.

"Aluminum almost always gives automakers the lowest weight component," says Michael J. Wheeler, automotive product development manager, sheet plate division, Alcan Aluminum.

Engineers from the aluminum, steel, and plastics industries competed to design the lightest-weight decklid at a passenger-car meeting sponsored by the Society of Automotive Engineers (SAE) two years ago. The winner was aluminum at 12.3 lbs, followed by SMC at 16 lbs and steel at 24.5 lbs.

SMC tooling is much less expensive than metal tooling but can produce fewer parts. Steel tooling costs two or three

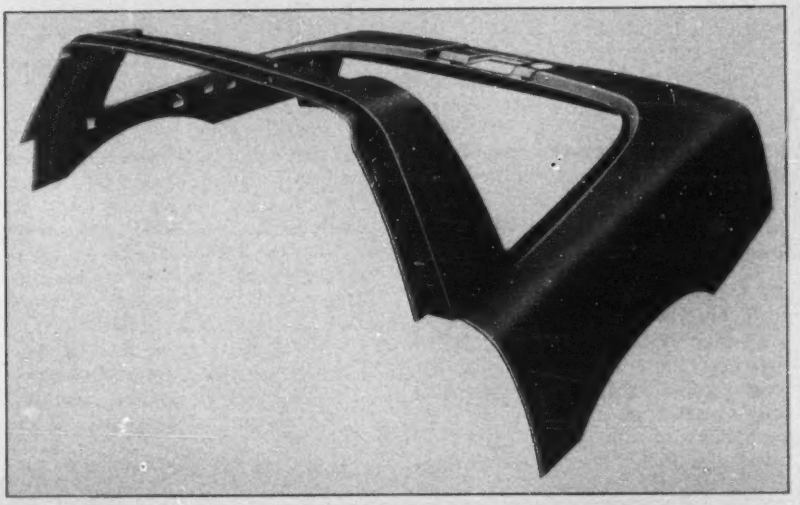


"Pontiac's sporty two-seater uses plastic body panels bolted to a steel "space frame." Source: Pontiac

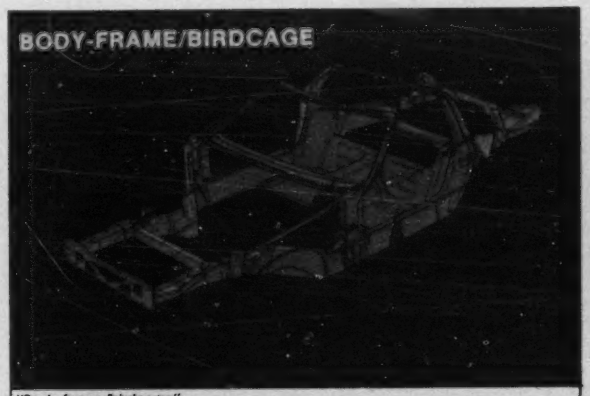
It's not that simple, says David B. Reed, materials engineering, Pontiac: "People who say that a plastic hood has twice the cost of a steel hood, are comparing the cost of steel stamped within the car company to the cost of a plastic hood bought from an outside supplier.

"Ford found that a plastic hood molded at Ford cost quite a bit less than a steel hood stamped by an outside supplier."

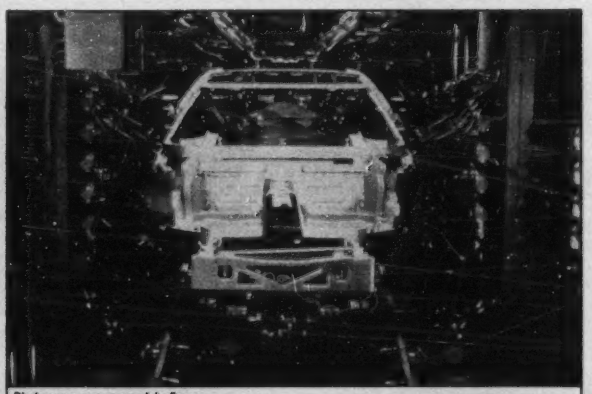
THE CORVETTE PRODUCTION PROCESS



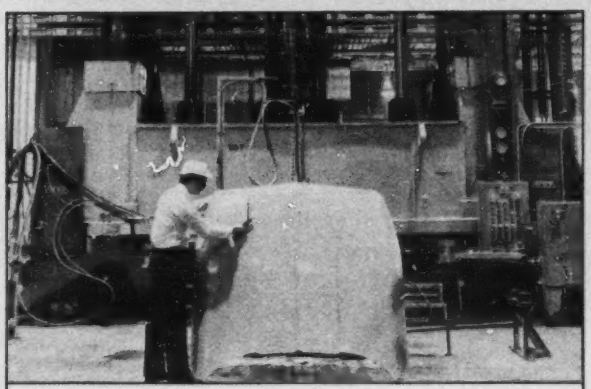
Rear roof assembly for Corvette: Plastic excels at consolidating several metals parts. Here four separate fiberglass reinforced plastic components form the rear roof of the 1984 Corvette.
Source: General Tire & Rubber Co.



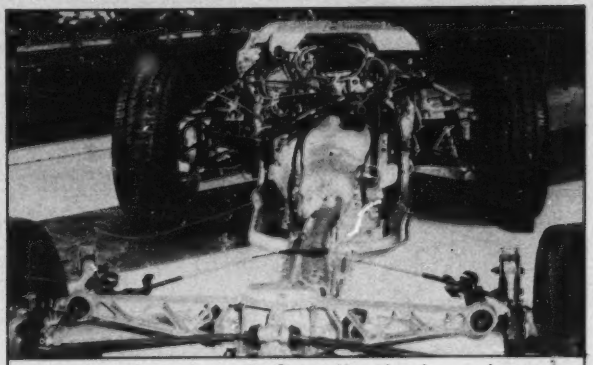
"Body-frame/birdcage"



Birdcage on assembly line



Huge press with plastic hood



"Aluminum industry calls Corvette aluminum story of 1984."

The 1984 Corvette has a plastic body skin over a metal frame, or "birdcage." The birdcage (top left) is made mainly of National Steel's galvanized steel but also of aluminum and aluminized steel. General Tire and Rubber makes the fiberglass-reinforced plastic outer hood panel with a hige press (bottom left) that can exert molding pressures of 2,500 tons. The Corvette also uses lot of forged and cast aluminum (bottom right) including forged aluminum front knuckles and upper and lower control arms, trailing arms, lateral struts, driveline channel beam and wheel drive shafts.

times more than SMC tooling, estimates Mr. Reed of Pontiac. Tooling for the inner and outer panel of a hood made of steel would cost about $3 million, he estimates; SMC, $750,000.

SMC tooling has a shorter lifetime than tooling for steel, however. SMC tooling might produce 100,000 panels, says Mr. Reinker of General Tire, "and that's stretching it."

Also, making SMC panels takes more time than do steel panels. The cycle time for the average SMC panel, estimates Mr. Reinker, is three minutes button-to-button. Cycle time on a steel stamping line, in contrast, can be about six seconds: 600 parts an hour.

One big advantage of SMC: Several metal panels can be consolidated into one SMC panel. However slow, one single-station SMC mold will turn out a finished piece that replaces several metal pieces that each required a line of tools to make.

"Plastic gives you the versatility," says Tom J. Kalush, Fiero engineering center, Pontiac, "to change the design of your product. It gives your product a newness, a freshness that metal doesn't have.

"You can mold complex shapes from plastic that would be horrendously expensive to stamp or form from metal. One example is the rear-quarter upper surround that enclosed the Fiero's back window.

"Also you can mold in electrical fittings, so that they're encapsulated in the part."

General Motors' Fisher Body, for example, replaced eight or nine metal pieces with a two-piece SMC part for the tailgate of some GM B cars. That saved 10 or 15 lbs. The liftgate of Ford's Bronco II is SMC.

Today's Chevrolet Celebrity uses SMC rear-end panels that consolidated several metal pieces. So will GM's future C and N cars.

The lower cost of SMC tooling makes SMC particularly attractive for vehicles produced in volumes of 100,000 per year or less. Automakers also can spin off variations of high-volume models by substituting SMC panels. An SMC hood sets apart the sporty Chevrolet Citation X11 from the rest of the X cars. The Camaro's hood is SMC.

"I expect plastic to be most successful in the short-run, innovative models," says Peter F. Connor, manager, product and market development, Inland Steel.

"The American auto market is getting fragmented," says Pontiac's Mr. Kalush. "Consumers are looking for specialized cars more suited to their particular needs. The downsized Blazer and also the mini vans are good examples. The convertible is coming back. We will see more name plates and smaller volumes per nameplate.

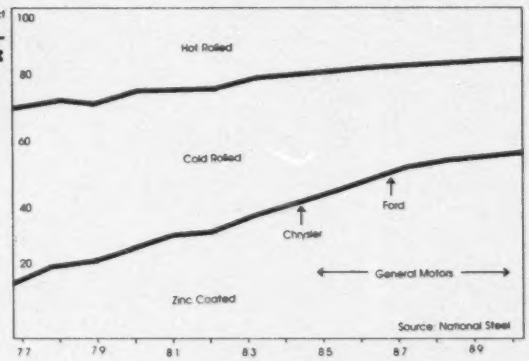
"Lower volumes open up more opportunities for automotive plastics."

Some engineers insist that SMC bodies can be economical at volumes above 100,000. GM, for example, made 200,000 SMC hoods for the Z28. Pontiac plans 80,000 to 100,000 Fieros the first year of production; but that could increase to more than 150,000 the second year.

"We could use two different sets of tools for the Fiero," says Mr. Reed of

(Cont. on p. 89)

STEEL PRODUCT MIX—MAJOR VEHICLE ASSEMBLERS



Average Material Costs for Major Automotive Materials

Material	Cost/Lb
Mild Steel*	$0.25
High Strength Steels*	$0.30
Cast Iron	$0.15
Plastics	$0.75
Wrought Aluminum	$1.15
Cast Aluminum	$0.90

*Not galvanized or treated with anti-corrosion coatings.
Source: Cochran and McClure, Aluminum Company of America

Projected Materials Usage in 1985

	Mild Steel	HSLA Steel	Aluminum	Fiber-reinforced Plastics or Composites	Non-reinforced Plastics
Hood—					
outer	50%	10%	10%	5%	0%
inner	50	15	10	5	0
Roof	90	0	0	0	0
Doors	50	20	0	0	0
Seat frame	30	30	5	2	0
Wheels	40	30	19	0	0
Gas tank	80	0	0	0	0
Bumper—					
fascia	5	20	20	0	20
support	10	50	15	0	0
Fenders	70	0	0	5	0
Suspension—					
springs	0	80	0	5	0
control arms	35	60	0	0	0
Radiator support	40	10	0	10	0
Floor pan	89	0	0	0	0
Cylinder head cover	70	0	10	5	0

Source: University of Michigan Delphi Forecast

Pontiac, "and build two different models with different skins. We'd still pay less than for one set of steel tooling."

Top priority for SMC custom molders is to reduce cycle times.

"We are learning how to reduce that three-minute cycle time," says Herbert A. Jahnle, manager, materials and environmental technology, Budd Co. Technical Center. "Already it's possible to mold an SMC decklid in 90 seconds. Sixty seconds is within reach. If we get to 60 seconds, we'll knock the hell out of steels.

"Also, we are cutting the cost of SMC panels by reducing their thickness. Standard SMC panels used to be ⅛ in. thick; now they're 1/10 in. thick.

"As we reduce panel thickness, cycle time, and cost, SMC will become competitive at higher volumes: 300,000 in a few years, I predict.

"We're a young industry. We're developing new techniques every day. Soon you'll see SMC not just on sporty cars but on family cars as well."

Two techniques developed in the past few years have improved dramatically the surface appearance of SMC.

In-mold coating, or molded-in coating, eliminates the pits and porosity that used to plaque plastics. SMC custom molders impregnate the SMC with urethane polyester while the panel is still in the tool. This adds 30 seconds to the cycle time of the SMC panel: Both the panel and the urethane coating must be cured.

The glass, polyester, and calcium carbonate used to make SMC all cool and shrink inside the mold at different rates. That can cause rippling. The new elastomeric modifier system, however, makes these materials shrink very little and even expand slightly to assume a more uniform final shape.

"We're satisfied with the surface appearance of our SMC and reinforced RIM," says Mr. Reed of Pontiac. "Even though our sheet-metal people still feel they have an edge, I can't see any difference between the steel or SMC finish.

"Fisher Body had several hundred employees inspect a dozen SMC and steel station-wagon tailgates under bright lighting. The employees actually preferred plastic."

"The difficulty comes," says Mr. Riffe of U.S. Steel, "when you put plastic, aluminum, and steel panels all on the same car body. Then even the unpracticed eye can see the difference in finish."

To improve corrosion resistance, automakers now are using an electrocoating ("E-coat" or "ELPO") system of painting that requires temperatures above 400°F. That's a tough challenge for SMC.

Chrysler's 1984 Mini-Ram Van pioneers new applications of galvanized steel. Chrysler has pioneered the use of 1½-side galvanized steel.

"Virtually no thermoplastics can survive that," says Mr. Reinker of General Tire. "Only the best thermosets can survive. It's critical that the temperature be raised gradually. If you put SMC into 400°F with no transition, the heat will cause blistering in the substrate.

"These paint ovens make our life more difficult, but we can deal with them. The Z28 hood and Bronco II liftgate run through these temperatures with minimal problems."

Paint is deposited electrostatically onto the Fiero's plastic body panels at 250°F. To prevent any warping, the panels are mounted on frames before they enter the paint oven.

"The paintability of the Fiero's RRIM panels," says Mr. Reed of Pontiac, "is better than steel's. The paint adheres better. The paint performance of our SMC panels is about as good as steel's."

SMC panels are repaired by an epoxy adhesive and polyester body-filler. "Tests so far," says Mr. Reed, "show that SMC panels cost less to repair than steel."

Dentability? "Plastics are the best," says Mr. Jahnle of Budd. "Steel's second best, and aluminum's the poorest performer."

Some speak darkly of plastic's degradation and even sagging in the hot sun. Not true, says the plastics people.

Plastics don't corrode. Aluminum also resists corrosion. Recent tests show that even unpainted aluminum doesn't corrode.

The paintability and surface appearance of aluminum is comparable to steel's. Unlike plastic, aluminum almost always saves weight when it replaces a steel hang-on part that doesn't have key structural responsibility.

"Plastic and aluminum are supposed to be lighter than steel," says Mr. Kalush of Pontiac. "But if they have much structural responsibility, they have to be beefed up so much that sometimes you don't save much weight."

Aluminum was most popular as an exterior body panel in the mid-1970's, when Detroit hustled to meet the corporate average fuel economies (CAFE) mandated by Washington. Without major adjustments to tooling, automakers could substitute aluminum for steel and save weight significantly.

Rushing to save weight, automakers sometimes didn't adjust their tooling to take into account the differences between aluminum and steel. The springback of the two metals is different. The formability of aluminum is poorer than the deep-draw automotive steels. Aluminum's formability, however, is more comparable to the new high-strength low-alloy (HSLA) steels.

"The first one or two stages of the tooling sequence," says Mr. Wheeler of Alcan, "have to be designed specifically for aluminum. That means significant

extra dollars.

"But once those unique tools give you the basic shape for, say, a hood, the next five or six tools can be the same for both steel and aluminum. Steel and aluminum also can go down the same paint line."

"Since aluminum has a lower modulus than steel," says Joseph H. King, manager, metallurgical engineering, Chrysler, "the draw dies must be designed with more overcrown. Otherwise you'll bend the aluminum more without forming it.

"Also, aluminum is softer and scratches more easily than steel. So you have to tailor your handling equipment for aluminum; and make sure the aluminum doesn't rub against steel rollers, for example."

Most automakers who used aluminum sheet to make CAFE requirements soon switched back to steel. Even when they learned how to tool for aluminum, they didn't want to pay the higher price of aluminum.

"An engineer can be a hero twice," says Mr. Riffe of U.S. Steel. "In the mid-70s his boss told him to take X number of pounds out of the vehicle immediately. The quickest way to do that was to substitute aluminum or plastic for steel. He's a hero.

"But the cost of the component has increased. Now his boss tells him to take X number of dollars out of the vehicle. So he comes up with a steel design that adds very little if any weight but definitely saves dollars. He's a hero again.

"Why didn't he go to steel in the first place? He didn't have time to redesign the familiar material."

Today, aluminum is used for very few major body panels. In recent years, Ford's Lincoln Continental and Versailles have used aluminum hoods but then gone back to steel. Oldsmobile ran both aluminum and steel hoods down essentially the same manufacturing line for use in some diesel and California models. Chrysler used aluminum panels on its Feather Duster but has used no major aluminum panels in the past several years.

"Aluminum simply isn't cost-effective as a skin material," says Mr. Harwood of Ford. "We typically consider it for heavier luxury cars. That's about the only place you can afford to use it."

"We use aluminum on a need-for basis," says Ronald S. Michalak, chief engineer, paint and corrosion resistance, Fisher Body. "I'm aware of only one or two current applications on GM bodies. We sometimes use it for the tulip panel, the small filler panel between the backlight and the decklid."

"We use aluminum on the car skin," says Mr. King of Chrysler, "exclusively for trim. For trim we like it better than stainless steel because of its corrosion characteristics.

"Since all our plants are geared up to produce steel, we'd find it very very difficult to produce one aluminum part in the plant. I don't think we'd produce an aluminum body panel internally. More likely we'd buy it from an outside source."

Aluminum doesn't spot-weld as consistently as mild steel, though it's comparable to galvanized steel. Except by exotic techniques, aluminum can't be welded directly to steel; it must be bolted on. Midland Ross is exploring ways to improve the weldability of aluminum and the tip life of equipment used to weld aluminum.

Electrogalvanized steel offers the best corrosion protection.

Truck cabs are a significant market for aluminum. Most of the major truck companies use aluminum for the major body panels of some truck-cab lines.

In passenger cars, the major market for aluminum is not sheet but structural castings and forgings. Of the 125 to 155 lbs of aluminum used in the average car in 1985, predicts Mr. Harwood of Ford, 100 to 110 lbs will be used for castings. The 1984 Corvette uses 375 lbs of aluminum, mainly castings and forgings.

"The high cost of tooling for aluminum and all metal panels is a major problem," says Mr. Wheeler of Alcan. "We need ways to make metal parts in lower volumes. Perhaps you could adapt Kirksite or some similar material to make lower-cost, lower-volume tooling that depended more on maintenance."

"The economies of scale," says Mr. Michalak of Fisher Body, "still favor steel. Our history, our knowledge, our tooling experience show that we're best prepared to continue producing steel vehicles for quite some time."

"Everybody wants a piece of our act," says Mr. Connor of Inland. "Had we stood still, our competitors would have succeeded. But we've made two important thrusts: We've improved the formability of our steels, and we've developed new coatings.

"We have lighter gage steels that resist corrosion better. Not only have automakers been taking weight out of the car; they've also been building them to last longer."

"Steel will lose some ground to the other materials in the next ten years," says Mr. King of Chrysler. "But I expect no significant shift during the next five years."

The two main challenges for the steel and auto industries have been to reduce weight and to increase corrosion resistance.

In the past several years, General Motors and Ford have reduced steel corrosion mainly by installing cathodic electrocoat paint systems in all their assembly paints.

"We're continually upgrading our corrosion protection," says Dennis M. McCarthy, supervisor, materials development, advanced vehicle engineering and technology, Ford. "Besides the cathodic electrocoat paint systems, we've run a clean-steel program; used zinc-rich primer materials on sheet metals; and applied sealer and waxes in the assembly plant.

"We've also used one- and two-side galvanized steel, and we expect to use more."

The consensus emerging among steel and automakers is that of the different steels electrogalvanized steel offers the best corrosion protection. Second best is hot-dipped galvanized; then Zincrometal; then painted steels; then bare steel.

"Electrogalvanized steel appears to offer the best corrosion protection of any steel," says Mr. Michalak of Fisher Body. "An electrogalvanizing facility is very important; it's needed for the auto industry to be totally satisfied."

American steelmakers presently have only two electrogalvanizing lines that produce automotive steels. U.S. Steel's Gary Works makes one-sided G90 galvanized. Sharon Steel's electrogalvanized line makes limited widths.

Japan has more electrogalvanized capacity. That could become a significant advantage for Japanese automakers.

National and Inland are among the American steelmakers who say they're seriously studying installation of an electrogalvanizing line. That might cost $100 million for an annual capacity of half a million tons.

"For a long period of time," says Mr. Michalak, "there's been just a lot of talk about electrogalvanizing.

"If the investment is too much for any one steel supplier to make, perhaps someone in the steel-handling world could build the facility. The electrogalvanizing could be done on a contractual basis, the way Zincrometal is done through a toll-coater."

"Electrogalvanizing," says David W. Gomersall, manager, product and process support, National Steel, "offers a lot more flexibility than hot-dipped in both the steel substrates and coatings you can use. Electrogalvanizing is a cold process in which the substrate is coated with zinc but otherwise not affected by

the process.

"Hot dip, on the other hand, is a thermal process in which the substrate is thermomechanically affected by the process.

"Also, the coating weight in hot-dip is controlled by air pressure. That's much harder to control than in electrogalvanizing."

"The distinct advantage of electrogalvanizing," says Mr. Michalak of Fisher Body, "is the ease of producing a consistent product day in and day out."

"Electrogalvanized has a more uniform deposition," says Mr. McCarthy of Ford, "so you need slightly less coating to get the same amount of protection as with hot-dipped."

"The thinner coating of electrogalvanized," says Mr. Gomersall of National, "improves its weldability. Also, you can tailor the electrogalvanized product's alloy or zinc coating to the paint system."

Since electrogalvanizing is a cold, or ambient-temperature, process, it can be used with continuous annealing lines (CAL). When Inland and Bethlehem start up their new CALs this fall, it's uncertain how the steel will be coated. Hot-dip coating the steel would undo the chemistries of the CAL cold-rolling.

In the next five years, automakers will continue to order more galvanized steels and fewer Zincrometals. By 1990, predicts National, zinc-coated steels will account for more than half the flat-rolled steels ordered by the auto industry.

Still unclear, however, is how much of what types of galvanized steels the automakers will buy.

"There is such a tremendous number of products available," says Mr. McCarthy of Ford. "We're still evaluating them all but haven't made final decisions.

"Currently we're using two-side galvanized. We'll continue using two-sided but we're looking at 1½-side galvanized, too. There will be growing applications of 1½-side galvanized."

Fisher Body is the largest single buyer of steel in the U.S.: 2 million tons per year. That includes 600,000 tons of galvanized steels; 520,000 tons of Zincrometal; and 134,000 tons of high-strength.

Fisher Body uses a heavy cathodic priming system that's not compatible with 1½-side galvanized.

Chrysler doesn't have that priming system. Of the Big 3, it has the most definite plans for steel use:

"We plan to use 1½-side galvanized exclusively," says Mr. King of Chrysler.

"We also would be very pleased if the domestic steel industry would develop an electrogalvanized equivalent to 1½-side.

"In 1983 we are using large amounts of one-side electrogalvanized steel. Our ultimate goal is 1½-side electrogalvanized."

One and one-half galvanized steel has an iron/zinc alloy on the exterior surface and free zinc on the interior. The iron/zinc side is much more weldable and has a smoother surface than the free-zinc side.

The free zinc provides strong galvanic protection against corrosion from the inside out. The free zinc sacrifices itself and forms white

When something chips the iron-zinc alloy on the exterior panel, says Mr. King, "our tests show that nothing happens. There is no red rust and no white rust. After five years according to our accelerated test, all you can see at the bottom of the crack is brown. There's no running rust."

The auto industry's goal is to guarantee ten years of no rust from the inside out (perforations); and five years of no rusting due to chips from stones, for example (cosmetic corrosion).

"In my judgement," says Mr. King, "a car can be free of perforations for ten years if you use all heavy-gage galvanized steel with both a heavy coating and a G-90 side."

Galvanizing cold-rolled steel adds not only corrosion resistance but also manufacturing challenges and some cost: Galvanized steel costs about 6¢ per lb more than cold-rolled steel, says Mr. King of Chrysler.

"The more coating you add to the steel surface," says Mr. McCarthy of Ford, "the poorer the paintability, weldability, and formability."

Most steelmakers are upgrading their hot-dip galvanizing lines. "We're getting to the point," says Peter B. Lake, marketing manager, product development, National Steel Group, "where we can produce a hot-dip product that's close to matching the performance of cold-rolled."

The weight of steel has remained surprisingly competitive with that of aluminum and steel. Steelmakers not only are improving their high-strength steels but also are learning how to tool thinner-gage mild steel.

"There is a place on the car for aluminum, for plastic, and for steel," says Mr. Riffe of U. S. Steel. "I'm going to fight to keep my place. I'll develop new materials, new techniques, whatever I need to fight." □

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EFFECTIVE AUGUST 22, 1983

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	168	159	171	118
Buffalo	27	31	30	4
Pittsburgh	220	204	194	145
Youngstown	95	90	96	74
Cleveland	136	128	114	103
Detroit	113	141	132	116
Chicago	412	453	459	321
Cincinnati	83	83	95	81
St. Louis	75	74	69	44
Southern	134	139	125	110
Western	83	88	87	77
U.S. Production	1,546	1,590	1,572	1,193

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective August 22, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,546	1,590	51,519	50,213
Capability Utilization Rate	53.7	55.2	53.8	51.3

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 2/14/83)	26.217	26.217	26.217	25.297
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 75.17	$ 75.17	$ 72.50	$ 55.83
No. 2 bundles	$ 45.50	$ 45.50	$ 45.50	$ 41.83
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh	$ 79.50	$ 79.50	$ 74.50	$ 57.50
No. 1 steel, Philadelphia	68.50	68.50	68.50	59.50
No. 1 steel, Chicago	77.50	77.50	74.50	50.50
No. 1 bundles, Detroit	71.50	71.50	71.50	56.50
Low Phos., Youngstown	79.50	79.50	77.50	63.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	71.50
No. 1 mach'y cast., Phila	95.50	95.50	95.50	100.50
No. 1 mach'y cast., Chi	109.50	108.50	108.50	102.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective August 22, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00 (Nom.)	76.00-80.00	1/4/82
Copper (C)	77.00-78.00	77.00-79.00	8/19/83
Lead	19.00-23.00	20.00-23.00	8/10/83
Magnesium Ingot	138.00	134.00-138.00	6/1/83
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	43.00	40.00-43.00	7/25/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $215.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $178.00
Bismuth, ton lots ..... $1.65-$1.75
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $421.75
Indium, dollars per troy oz. $3.50
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$275-$280
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $12.20
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

August 15—581.62 August 18—584.70
August 16—579.67 August 19—584.54
August 17—584.57

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	74⅛	68¼
Yellow brass	63⅜	60¾
Red brass	68⅛	64½
Comm. bronze	69⅞	65¾
Mang. bronze	64⅛	61¾
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	68
No. 2 copper wire	60
Light copper	51

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	64
No. 2 copper wire	56
Light copper	47
No. 1 composition	57
No. 1 comp. turnings	55
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	29
Radiators	47

Aluminum

New mixed clips	47	—48
Old sheet	46	—47
Old cast	46	—47
Clean dry borings	46	—47

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	40	—41
Mixed L.C. clips	34	—35
Old sheets and cast	33	—34
Borings and turnings	23	—24
Duraluminum clippings	29	—30

Copper and Brass

No. 1 copper wire	60	—61
No. 2 copper wire	53	—54
Light copper	47	—48
Radiators	37	—38
No. 1 composition	48	—49
No. 1 composition turn'gs	45	—46
Cocks and faucets	34	—35
Clean heavy yellow brass	31	—32
Brass Pipe	33	—34
New soft brass clippings	47	—48

Lead

Heavy soft lead	8	— 9
Whole batteries	3	— 4
Type metal	15	—16
Electrotype	13	—14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	50	— 60

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

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MATERIALS NEWSFRONT

(Effective August 22, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 79.00 to	$ 80.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	94.00 to	95.00
No. 1 factory bundles (auto)	92.00 to	93.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	92.00 to	93.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	26.00 to	27.00
Cast iron borings	25.00 to	26.00
Low phos. punchings plate	94.00 to	95.00
Heavy turnings	69.00 to	70.00
No. 1 RR hvy. melting	88.00 to	89.00
Rails 2 ft. and under	102.00 to	103.00
Scrap rails, random lgth.	90.00 to	91.00
RR specialties	98.00 to	99.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	600.00 to	610.00
18-8 turnings	500.00 to	510.00

Chicago

No. 1 hvy. melting	$ 77.00 to	$ 78.00
No. 2 hvy. melting	72.00 to	73.00
No. 1 dealer bundles	99.00 to	100.00
No. 1 factory bundles (auto)	93.00 to	94.00
No. 2 dealer bundles	44.00 to	45.00
No. 1 busheling	91.00 to	92.00
Shredder scrap	84.00 to	85.00
Machine shop turn.	23.00 to	24.00
Mixed bor. and turn.	24.00 to	25.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	44.00 to	45.00
Low phos. forge crop	96.00 to	97.00
Low phos. punchings plate ¼ in. and heavier	107.00 to	108.00
Low phos. 2 ft. and under	102.00 to	103.00
No. 1 RR hvy. melting	87.00 to	88.00
Scrap rails, random lgth.	81.00 to	82.00
Reroller rails	95.00 to	96.00
Rails, 2 ft. and under	99.00 to	100.00
RR couplers and knuckles	87.00 to	88.00
RR car axles	114.00 to	115.00
No. 1 machinery cast	109.00 to	110.00
Cupola cast	97.00 to	98.00
Stove plate	92.00 to	93.00
Steel car wheels	96.00 to	97.00
Stainless		
18-8 bundles and solids	570.00 to	580.00
18-8 turnings	470.00 to	480.00
430 bundles and solids	135.00 to	140.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	54.00 to	57.00
No. 1 dealer bundles	78.00 to	81.00
No. 2 dealer bundles	39.00 to	42.00
No. 1 busheling	78.00 to	81.00
Shredder scrap	80.00 to	83.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	41.00 to	44.00
Low phos. 5 ft. and under	77.00 to	80.00
Low phos. 2 ft. punchings	90.00 to	93.00
Electric furnace bundles	93.00 to	96.00
RR specialties	81.00 to	84.00
Rails, 2 ft. and under	92.00 to	95.00
Cupola cast	58.00 to	61.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	94.00 to	97.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	36.00 to	37.00
No. 1 busheling	69.00 to	70.00
Drop forge flashings	45.00 to	46.00
Machine shop turn.	27.00 to	28.00
Mixed borings and turn.	16.00 to	17.00
Shoveling turnings	27.00 to	28.00
Cast iron borings	15.00 to	16.00
Heavy breakable cast	34.00 to	35.00
Mixed cupola cast	50.00 to	51.00
Automobile cast	73.00 to	74.00
Stainless		
18-8 bundles and solids	470.00 to	480.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	39.00 to	42.00
No. 1 dealer bundles	85.00 to	88.00
No. 2 dealer bundles	37.00 to	40.00
Machine shop turn.	1.00 to	3.00
Shoveling turnings	5.00 to	8.00
Low phos. plate	79.00 to	80.00
Electric furnace bundles	74.00 to	77.00
Galvanized bundles	66.00 to	69.00

Cleveland

No. 1 hvy. melting	$ 60.00 to	$ 63.00
No. 2 hvy. melting	32.00 to	35.00
No. 1 dealer bundles	85.00 to	88.00
No. 1 factory bundles	87.00 to	90.00
No. 2 bundles	22.00 to	25.00
No. 1 busheling	84.00 to	87.00
Machine shop turn.	1.00 to	4.00
Mixed bor. and turn.	1.00 to	4.00
Shoveling turnings	3.00 to	6.00
Cast iron borings	6.00 to	9.00
Cut structural & plates, 2 ft. and under	99.00 to	102.00
Low phos. punchings plate	99.00 to	102.00
Drop forge flashings	37.00 to	40.00
Foundry steel, 2 ft. & under	57.00 to	60.00
No. 1 RR hvy melting	77.00 to	80.00
Rails, 2 ft. and under	102.00 to	105.00
Rails, 18 in. and under	103.00 to	106.00
Steel axle turnings	67.00 to	70.00
Railroad cast	80.00 to	83.00
No. 1 machinery cast	87.00 to	90.00
Cupola cast	60.00 to	63.00
Stove plate	45.00 to	48.00
Stainless		
18-8 bundles	325.00 to	335.00
18-8 turnings	275.00 to	285.00
430 bundles	80.00 to	85.00

Buffalo

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	44.00 to	45.00
No. 1 busheling	74.00 to	75.00
No. 1 dealer bundles	73.00 to	74.00
No. 2 bundles	30.00 to	31.00
Machine shop turn.	12.00 to	13.00
Mixed bor. and turn.	13.00 to	14.00
Shoveling turnings	17.00 to	18.00
Cast iron borings	12.00 to	13.00
Low phos. plate	74.00 to	75.00
Structural and plate, 2 ft. and under	70.00 to	71.00
Rails, 2 ft. and under	82.00 to	83.00
Scrap rails, random lgth.	65.00 to	66.00
No. 1 machinery cast	67.00 to	68.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 66.00 to	$ 67.00
No. 2 hvy. melting	55.00 to	56.00
Foundry steel, 2 ft.	54.00 to	55.00
No. 1 dealer bundles	66.00 to	67.00
No. 2 bundles	52.00 to	53.00
Machine shop turn.	15.00 to	16.00
Shoveling turnings	22.00 to	23.00
Cast iron borings	33.00 to	34.00
No. 1 RR hvy. melting	77.00 to	78.00
Rails, random length	74.00 to	75.00
Rails, 18 in. and under	90.00 to	91.00
RR specialties	83.00 to	84.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	75.00 to	76.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	97.00 to	98.00
Unstripped motor blocks	57.00 to	58.00

Birmingham

No. 1 heavy melting	$ 70.00 to	$ 71.00
No. 2 heavy melting	64.00 to	65.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	71.00 to	72.00
Shredder scrap	84.00 to	85.00
Machine shop. turn.	24.00 to	25.00
Shoveling turnings	32.00 to	33.00
Cast iron borings	33.00 to	34.00
Electric furnace bundles	67.00 to	68.00
Elec. furnace, 3 ft. & under	64.00 to	65.00
Structural and plate, 2 ft.	91.00 to	92.00
Structural and plate, 4 ft.	85.00 to	86.00
No. 1 RR hvy. melting	71.00 to	72.00
Scrap rails, random lgth.	80.00 to	81.00
Rails, 18 in. and under	90.00 to	91.00
Angles and splice bars	85.00 to	86.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	64.00 to	65.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 60.00 to	$ 61.00
No. 2 hvy. melting	57.00 to	58.00
No. 1 dealer bundles	68.00 to	69.00
No. 2 bundles	30.00 to	31.00
Machine shop turn.	7.00 to	8.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	14.00 to	15.00
Low phos. 18 in. and under	85.00 to	86.00
Rails, random length	70.00 to	71.00
Rails, 2 ft. and under	88.00 to	89.00
No. 1 cupola cast	67.00 to	68.00
Heavy breakable cast	34.00 to	35.00
Drop broken cast	80.00 to	81.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	490.00 to	510.00
18-8 turnings	390.00 to	410.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	44.00 to	46.00
No. 2 bundles	29.00 to	31.00
No. 1 busheling	44.00 to	46.00
Shredder scrap	43.00 to	45.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	9.00
No. 1 machinery cast	100.00 to	105.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 42.00 to	$ 44.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	13.00 to	15.00
Machine shop turn.	6.00 to	8.00
Cast iron borings	6.00 to	8.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	29.00 to	31.00
No. 1 dealer bundles	27.00 to	29.00
No. 2 dealer bundles	10.00 to	12.00
Machine shop turn.	6.00 to	8.00
Shoveling turnings	10.00 to	12.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under (foundry)	85.00 to	87.00
No. 1 cupola cast	87.00 to	89.00

Seattle

No. 1 hvy. melting	$ 59.00 to	$ 61.00
No. 2 hvy. melting	48.00 to	50.00
No. 2 bundles	38.00 to	40.00
No. 1 cupola cast	94.00 to	96.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 55.00
No. 2 heavy melting cut 2 ft. and under	52.00
No. 1 dealer bundles	60.00
No. 2 bundles	30.00
Mixed steel scrap	34.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	25.00
Short steel turn.	28.00
Mixed bor. and turn.	15.00
Cast scrap	48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 71.00 to	$ 72.00
No. 2 hvy. melting	53.00 to	55.00
No. 2 bundles	34.00 to	35.00
Machine shop turn.	19.00 to	20.00
Crushed turnings	36.00 to	38.00
Shredder scrap	71.00 to	72.00
Cut structural plate 2 ft. and under	86.00 to	89.00
Unstripped motor blocks	57.00 to	59.00
Cupola cast	73.00 to	75.00

STEEL PRICES

Codes identify Producers listed in the Key on page 106. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A.—Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10, U1	$453.00
R3	$453.00
Midwest	
R3, U1, W5	$453.00
S1	$420.00
C10	$453.00
K2	$453.00
W5	$453.00
West	
B3(2)	$463.00
C6	$453.00
South	
A7	$453.00
Alloy, East	
R3, C10	$492.00
B3	$492.00
Midwest	
W8, W5, C10	$492.00
U1	$492.00
R3	$492.00
S1	$459.00
West	
B3	$502.00
C6	$469.00
South	
A7	$492.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7	24.15
C20	22.90
W8	22.90
I3, T10, U1, N4	23.90
West	
C6	25.10
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	23.90
W8	24.15
U1	23.90
I3	23.90
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	23.90
I3	23.90
West	
U1	24.40
C6	24.15
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut ll Edge—all widths, East	
B3, U1	22.05
J3	22.05
Midwest	
A7, D1	22.05
I4	21.45
S1, J3, D1	22.05
W3	22.05
N4	22.55
W5	22.05
U1	22.05
B3, G2, I3, M2, R3, G3	22.05
West	
K1	20.80
B3	26.55
South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
R7, S10	29.60
P15	24.80
S7	Cmp*
U1	35.30
D1(1)	Cmp*
B4	33.60
Midwest	
G4	24.80
I4	35.30
W14	22.95
S1, J4	34.05
T4	Cmp*
*Composite pricing	
West	
U1	33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, (plus extras)†	
Midwest	
M2, G3, R3, W3, I4, J3, G2, I3	22.05
A7	22.05
S1	22.05
West	
K1	22.05
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	24.60
G4	25.80
I4	23.70
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	42.60
P15	32.10
Midwest	
I4	41.80
S1	42.30

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	22.05
J3	22.05
U1	22.05
Midwest	
A7, U1, B3, G2, G3, I3, M2, R3, W3	22.05
S1, W5, D1	22.05
J3	22.05
I4	21.15
West	
U1	21.30
K1	22.05
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2), U1	26.15
J3	26.15
Midwest	
B3, I3, G3, R3, M2, U1(2)	26.15
G2, W3, M11	26.15
I4	22.00
J3, A7	26.15
S1, W5, D1	26.15
West	
U1	26.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2), U1	28.00
Midwest	
J3, D1	28.00
I3, W5, S1	28.00
U1, A7, R3, Y1	28.00
G2, W3, M11	28.00
West	
K1	27.15
U1	28.50
South	
U1	28.00
R3	28.00
Enameling, Midwest	
A7, I3, U1, J3	27.65
S1	27.65
Long-Terms, Midwest	
W5	28.30
A7, U1	29.35
R3	29.35
†Actual weight basis	

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate

Single Reduced (70 lb)	
East	per base box
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$26.79
U1	26.79
South	
U1	$26.29
Double Reduced (55 lb)**	
Midwest	
M11	$21.49
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$21.99
U1	21.99
South	
U1	$21.49
Black Plate	
Single Reduced (75 lb)*	
East	
B3	$23.36
Midwest	
J3	$24.01
M11	24.01
I3, U1, W5	24.01
W3	24.01
West	
K1	$24.01
U1	23.36
Double Reduced (55 lb)	
East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

*70 lb—base weight extra 45¢
**50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3	25.80
R5	25.80
B3(3), J3	25.80
U1, C10	25.80
Midwest	
A7	23.95
U1, I3, I4, C20, N4	25.80
R3, T10	25.80
K2	25.80
I3	19.50*
West	
B3	25.80
C6	24.45
South	
A8	20.65
A7	25.80
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
C21	21.15
J3(4), L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	31.00
M1	23.025
B4, C10	31.00
Midwest	
B5, W10, Y1, W8, R3, M9	33.25
J3	31.00
B1	19.80
L2	30.75
N9	31.00
P3	19.85+CMS
W14	22.20
J3(3)	31.00
J3	31.00
West	
B5	34.90
R3	37.15
South	
B5	32.85
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10, U1	27.95
R3	27.95
J3	27.95
Midwest	
A7, U1, R3	27.95
I3, C10	27.95
I4	24.85
I3	21.00*
West	
B3	27.95
B5	18.50
C6	26.60
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	37.90
M1	28.025
R4	25.85
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	34.20
Midwest	
R3, C10	37.35
C2	28.275
J3, W10	34.85
P3	22.75
B1	22.70
N9	34.85
L2	34.65
B5	37.10
J3	36.00
J3	34.85
M9	37.10
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3(2), U1	25.75
L4	25.75
P2	25.75
J3	26.75
Midwest	
B3, R3, S1	25.75
I3	24.25
J3, A7	22.80
U1, I4	25.75
R3	26.75
West	
A7, C6, O2	24.25
K1	23.50
U1, B3	25.75
South	
R3	25.75
A7	25.75
U1	25.75
Alloy, East	
B3, J3	33.55
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	33.55
G2, G3	33.55
I4, U1	33.55
West	
B3	32.05
O2	30.55
K1	31.30
South	
A7	27.55

Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
U1	27.70
A7, R3	24.80
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
A7	25.95
C6	24.95

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N8 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities* / City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	21.79	29.06	30.99	29.47	20.27	24.13	17.51	30.17	42.10	52.60	69.58	73.19
Baltimore	28.67	28.19	35.29	37.30	24.85	28.64	19.19	36.85	55.85	59.91	69.79	76.32
Birmingham	21.49	29.10	30.69	29.55	20.89	24.20	17.31	29.88	49.31	68.90	68.16	74.43
Boston	25.11	29.68	34.62	45.11	35.11	37.52	20.95	41.20	48.40	52.69	62.29	67.33
Buffalo	28.09	34.26	38.88	42.37	33.04	28.77	17.80	41.10	39.03	48.82	56.33	64.06
Chicago	23.48	29.72	32.66	31.86	22.71	22.09	16.58	30.33	36.47	40.64	46.92	53.01
Cincinnati	23.39	28.64	31.57	32.00	23.70	23.49	16.46	30.51	35.04	39.58	43.36	49.78
Cleveland	26.14	31.77	33.83	34.38	26.55	29.66	15.69	29.89	34.02	39.96	44.20	50.99
Denver	33.10	40.58	37.46	41.88	34.45	35.59	21.42	41.66	51.78	59.12	67.62	70.99
Detroit	25.72	31.94	34.08	35.88	28.05	29.93	17.10	31.65	35.74	40.44	48.09	52.99
Houston	22.36	28.61	31.90	37.78	32.24	35.46	17.85	39.48	39.28	45.22	53.75	60.10
Kansas City	21.35	26.53	31.75	29.42	26.77	28.84	16.15	33.30	38.29	48.63	53.40	62.04
Los Angeles	25.20	31.50	36.22	36.87	33.73	35.10	27.82	40.90	50.17	58.10	63.65	73.22
Memphis	26.12	33.39	33.91	36.10	27.96	34.24	19.47	37.60	45.09	49.96	59.80	69.44
Milwaukee	23.58	29.65	30.87	32.01	23.77	26.33	15.92	32.06	35.95	41.55	45.68	52.45
New York	22.03	30.31	33.26	39.11	27.90	32.37	19.13	42.13	45.80	53.04	62.17	69.31
Philadelphia	28.39	35.11	36.92	46.98	30.88	35.97	19.70	39.64	46.41	52.66	62.06	69.23
Pittsburgh	26.55	32.66	35.16	41.38	32.45	29.51	20.41	41.30	48.51	54.05	61.11	68.88
Portland	25.66	33.27	38.17	31.11	31.04	34.76	27.50	44.85	49.78	57.74	70.44	....
San Francisco	25.76	32.84	36.85	41.13	32.49	33.46	28.78	48.02	57.14	66.13	76.05	84.10
Seattle	24.74	32.32	36.15	40.49	29.35	30.37	29.55	50.60	63.37	71.57	76.28	87.67
Spokane	21.00	30.34	34.28	37.91	33.00	33.75	21.80	43.01	43.20	47.52	....	58.32
St. Louis	24.07	30.42	32.35	33.03	26.14	27.28	16.48	32.42	34.06	39.65	47.02	53.40
St. Paul	24.39	27.90	31.48	32.42	26.33	28.12	15.45	32.93	34.26	39.60	44.90	52.20

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ¾-2^{15}/$_{16}$; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1⅝" round; Cold drawn—1" round; Hot-rolled 4140—1⅝" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

QUALITY IN AMERICA—PART V IN A SERIES: HOW NONDESTRUCTIVE TESTING HELPS
MANUFACTURING SYSTEMS SERIES 44: HOW CAPP MAKES ORDER OUT OF CHAOS

SEPTEMBER 23, 1983

Chilton's

IRON AGE

THE MAGAZINE FOR METALWORKING MANAGEMENT

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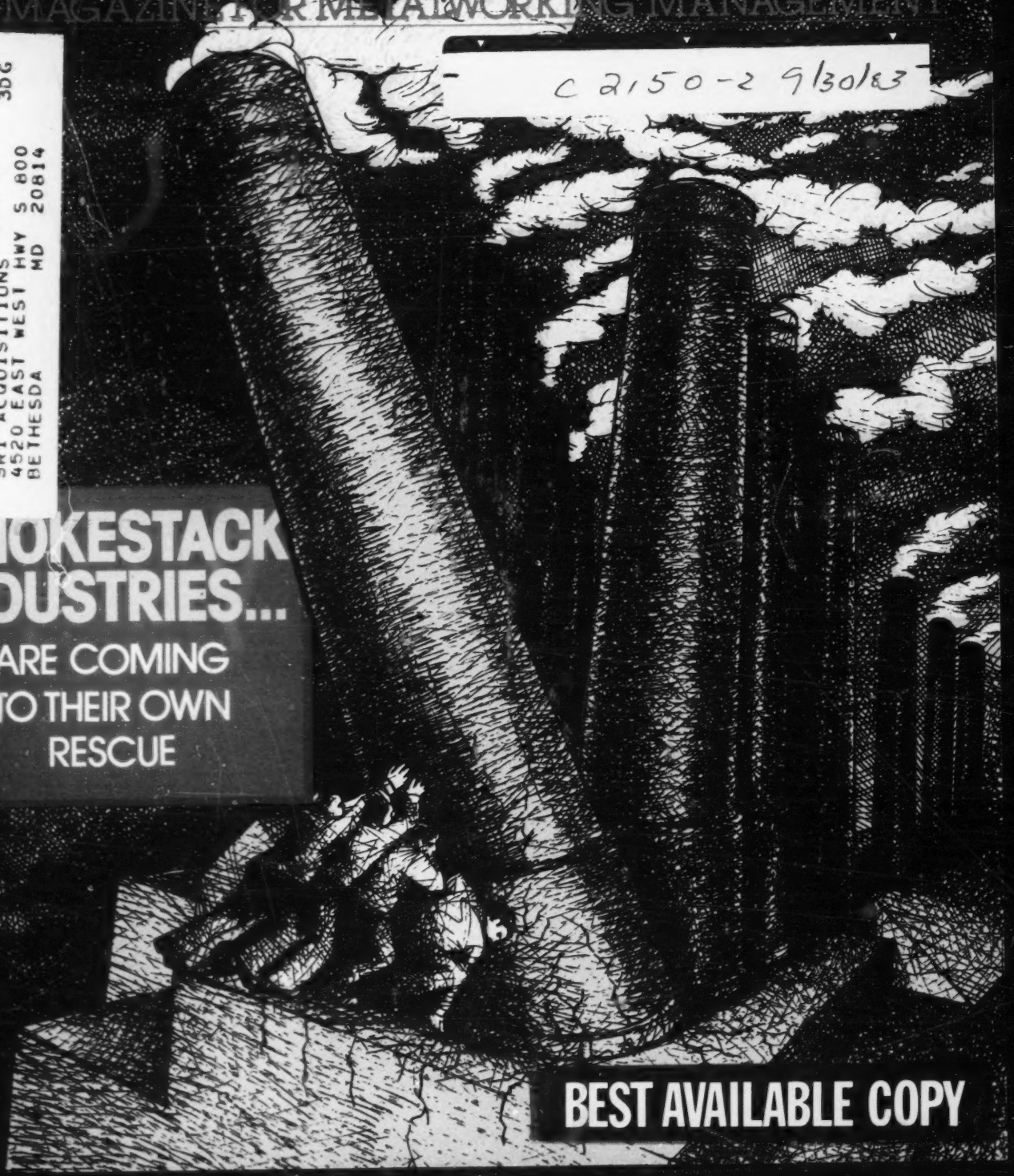
SMOKESTACK INDUSTRIES...

ARE COMING TO THEIR OWN RESCUE



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VOL. 226, NO. 24

IRON AGE

SEPTEMBER 23, 1983

COVER STORY

33 **SMOKESTACK INDUSTRIES ARE COMING TO THEIR OWN RESCUE**
As a national debate rages over how to 'save' basic industries, those industries are whipping themselves into fighting shape.

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84 **MATERIALS NEWSFRONT**
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100 **BUSINESS FORECAST**
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Fourth quarter forecast: The fast run is over—now for the long haul.

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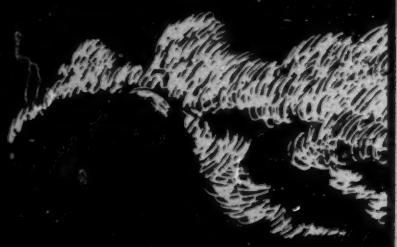


SMOKESTACK INDUSTRIES...

ARE COMING TO THEIR OWN RESCUE

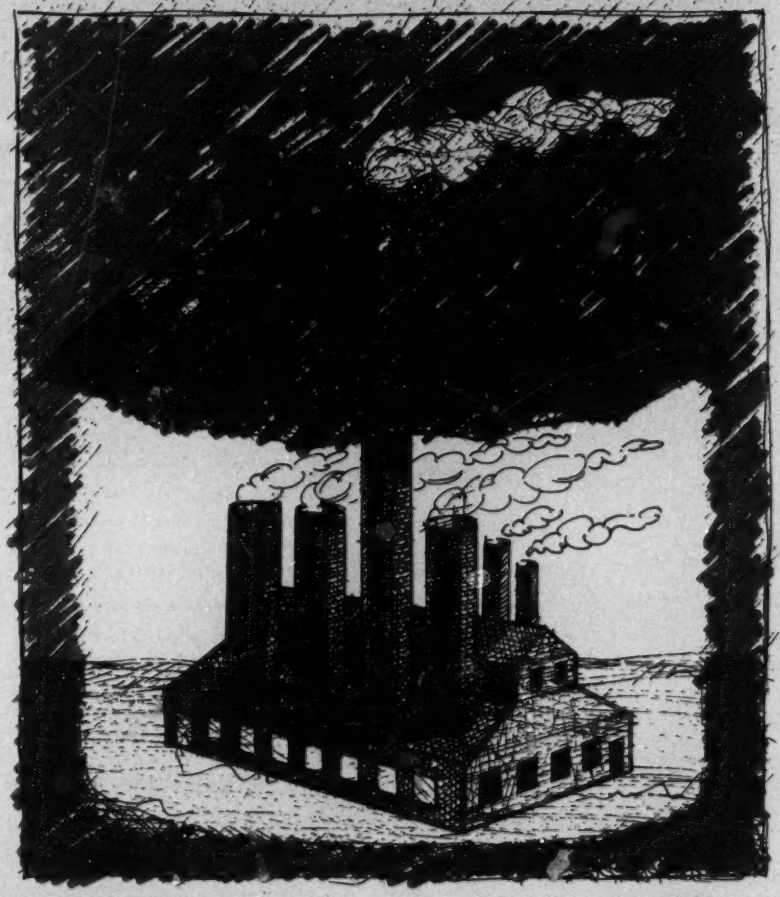
The debate on reviving Smokestack America centers on what the government should not do, and what basic industries must do for themselves.

Some people have all but carted U.S. smokestack industries off to the cemetery.

Their vision of tomorrow is a U.S. economy propelled onward and upward by high-tech industries and services.

Cooler heads are saying, 'Hold it!'

Many call for an 'umbrella' industrial policy to aid basic goods manufacturers.



They are saying that reports of the demise of smokestack industries are greatly exaggerated. They point to active industries making and selling hundreds of billions of dollars worth of basic goods and employing about 8 million Americans.

In short, the 'reindustrialization' debate roars on in this country. And, at the eye of the debate storm is the question of ailing U.S. smokestack industries

The cooler heads seemingly have redefined, or shifted, the debate on the issue of America's smokestack, or basic, industries.

Increasingly, the issue is no longer a matter of being 'for' or 'against' the need for these industries; it is now more on 'we need basic industries, so how do we make them strong?'

This reality on the need for smokestack industries has been increasingly accepted. For one, it is widely agreed these industries are needed for reasons of national security. If all the products of basic industries are taken away from the U.S. military arm, the Pentagon wouldn't have much of a war machine to run.

Too, there is the increasingly accepted need for basic industries in making up a balanced U.S. economy. An economy as large and as complex as that of the U.S. simply can't write off its basic industries and expect to survive as a major industrial power.

Not to be overlooked, even by the most zealous high-tech advocate, is another point: How can there be a healthy high-tech industry in this country unless its No. 1 customer--basic industries--is also healthy?

Notes one economist actively engaged in the debate on smokestack industries, "It's not that we don't need these industries. What we don't need, and can't afford, is sick smokestack industries. So, turn the coin, and it is seen that what we very much need in this country is strong basic industries."

How to get them strong again is now really the issue. Some look to industrial policy--a comprehensive policy marked by heavy government intervention into the private sector. At the other end of the debate spectrum, some want the government to stay out of the way, and to simply clear the way for business to help itself.

Any policy to deal with the problem of smokestack industries must be based on their actual state of health or sickness, and in knowing how they got that way.

This *Iron Age* report looks at these points and at what government policies might likely be effective.

First off, it has to be clear just what industries are covered by the label 'smokestack.'

'Smokestack' industries is a term, a label, probably concocted long ago by some business speechwriter or reporter. Everybody seems to have their own idea of what industries come under the sweeping label.

This report views smokestack industries simply as mature manufacturing industries that make basic, or at least traditional, products. In this context, the terms 'smokestack' and 'basic' are interchangeable.

Actually, it is easier to name indus-

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tries that fit the bill rather than to try to define the term.

Certainly, metals producing industries rate the term. This is a mature industry group and its products could not be more basic.

Transportation equipment manufacturers are smokestackers. This includes autos, trucks, buses, rail cars and even commercial aircraft.

Companies that make heavy industrial goods such as business capital equipment and machinery are included in the smokestack, or basic, category. Also, textiles, rubber and many lines of commodity chemicals are included. (This report does not cover these latter industries).

How hard have these U.S. smokestack industries been hit?

There is no getting around it, they have been hit hard.

A radical shrinkage in the workforce of some U.S. basic industries is one measure of how bad they have been hit.

In 1957, the steel industry in this country hit a peak in its employment rolls. It employed 952,000 workers. In 1982, the industry had 653,000 workers on its payrolls, some 31 pct less than in 1957.

The auto industry held on to its workers a bit longer. In 1978, it employed more than 1 million workers. In 1982, this workforce was down to 716,000 employees, a 30 pct drop.

Probably, the most telling story on downsizing of manufacturing in this country—led by basic industries—is seen in just one figure: In 1960, there were 12.6 million production employees at work in U.S. manufacturing. In June of 1983, there were 12.6 million production workers on the job in U.S. factories. Net gain: Zero!

Over the years, employment in an industry doesn't fall, or remain stagnate, unless orders and shipments and other measures of business health are failing. And that holds true for U.S. basic manufacturing industries.

For example, steel shipments peaked at more than 111 million tons in 1973; last year, they came to about 61 million tons. Retail sales of U.S.-made autos peaked at 9.7 million units in 1973; last year they totaled 6.2 million units. Machine tool orders in 1979 totaled $5.5 billion; at an annual rate this year based on first half performance, orders will likely be around $1.5 to $2.0 billion.

The list could go on. The story on sliding business volume extends from steel down to basic manufacturers making bearings, valves, nuts and bolts and so on. Too, the loss of jobs has been "across the board."

These figures are measures taken during a deep recession. But few economists, or even few executives in basic industries, can be found who say that old peaks will be matched or exceeded in the present recovery.

As a matter of fact, the steel industry is not even thinking in terms of matching old peaks of output. It is reducing capacity—some 15 pct, so far—and following a strategy of 'smaller and leaner is better.' The auto industry, too, is shaking down. The shrinkage strategy is apparent in other basic goods lines.

Loss of workers is one thing. But lower output per remaining worker is another. And that is what has happened in basic industries, and all manufacturing, in this country.

Worker productivity in the industry between 1976 and 1982 fell by 9 pct. In primary aluminum, it fell by 4 pct.

In the machine tool industry, labor productivity between the same years fell by 11 pct; in farm machinery—another basic industry—it fell by 4 pct.

In the auto industry, productivity was up 7 pct over the measured years—an annual rise rate of just slightly more than 1 pct.

Did this hurt U.S. basic industries in their efforts to hold their place in the international sun? Well, in a comparison of manufacturing labor productivity for the years 1970-80, U.S. industry tied for last place (with the U.K.) in a list of the world's top 11 industrial nations. The U.S. average annual growth in labor productivity over the years was 2.6 pct. The annual increase rate for other nation's manufacturing industries ranged from 7.2 pct for Japan to 3.7 pct for Sweden.

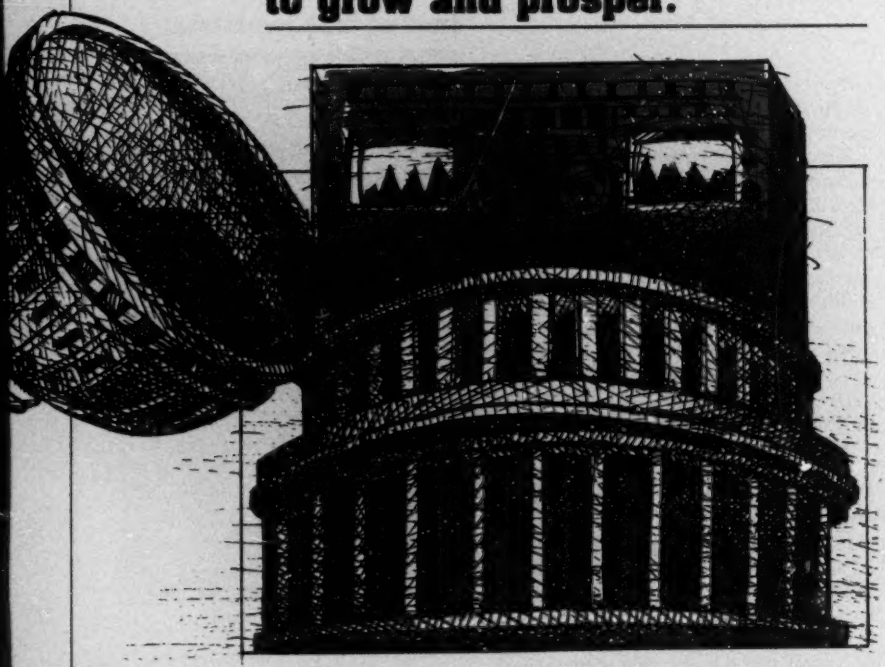
Worse, productivity of workers in U.S. manufacturing—and especially basic industry—has been poor, but **not** worker earnings.

Through the past decade, average labor costs in manufacturing have gone

Slower and more volatile economic growth hurts cyclically—sensitive smokestack industries

Pct of Years with Negative Growth

U.S. must give every chance for high-technology industries to grow and prosper.



up about 7 pct per year. Again, the upside leader was basic manufacturing.

At the end of last year, the average hourly earnings of production workers in basic industries came to $9.96 (not including benefits). This was 15 pct higher than for all U.S. manufacturing and almost incomparably higher than wages in service industries.

In sum, while U.S. basic industries have been shrinking in size and slumping in business volume, its worker productivity has been plummeting and its labor costs have been rising.

Where it all comes out in the wash, is in foreign invasions of the home markets of U.S. basic manufacturers. Imports have been flogging the weakened body of this country's smokestack industries. One analyst calls the import flood, "the crown of thorns" for these industries.

In the 1973-81 period, the value of steel imports into this country grew by a compound annual rate of growth of 18 pct. The flood averaged 22 pct for primary nonferrous metals, 25 pct for construction machinery, 15 pct for motor vehicles and 13 pct for farm machinery.

Imports in any one year have grabbed off 25 pct of domestic steel markets and 27 pct of auto markets.

Again, one telling figure can tell much of the story: In 1982, U.S. imports of machine tools accounted for 44 pct of all machine tool units sold in this country.

Industries hard-pressed by imports are hardly in a position to boost their exports. That's been true for U.S. basic manufacturers. The U.S. share of world exports fell from 13.7 pct in 1970 to 10.8 pct in 1980.

This U.S. world export share decline was led by basic manufacturers. Steel went from 9.2 pct to 5.0 pct. Machine tools from 18.1 pct to 11.7 pct. Electrical machinery fell from 19 pct to 10 pct.

To top off this litany of setbacks, is the fact that U.S. basic industries haven't been able to generate the earnings, and to raise the capital needed to modernize their plants and thus fight their way out of their besieged trenches.

Notes D. Bruce Merrifield, U.S. Commerce Dept. Assistant Secretary for Technology, Productivity & Innovation, "Smokestack America is in very serious trouble. Many companies aren't getting anywhere near a 15 pct return on equity. Many are in the 5 pct to 10 pct range, or even lower. They are liquidating their companies at a very significant rate.

"The auto and steel industries, in particular, are eroding their assets at a very rapid and alarming rate."

If a turning point in all the troubles of basic manufacturers could be foreseen, then the burden of problems might be more bearable.

Here's the way Preston Martin, vice chairman of the Federal Reserve Board puts it:

"There is a structural adjustment that every one of the western nations has to go through. That is the surrender of the old mentality that we in the United States, France, UK, Germany, Japan or whatever it is, are the greatest manufacturing assemblers, best engineers in the world in producing all those automobiles and steel and so forth.

"I think that each of these countries is going to find that those classic industries of the 1950's are going to shrink. The South Koreans of the world are going to do that for us, do that with great enthusiasm and with new plants and robotics and all the rest. It's a very difficult adjustment for us to make."

So, it looks like the troubles of America's basic, or smokestack, industries are for real. They are in trouble.

In sum, the troubled scenario for America's basic industries has been one of high labor costs coupled with slow-growth productivity. This, and a protracted slow-growth economy put a serious crimp in earnings, which, in turn, led to a deferral of badly-needed plant modernization.

And all that opened the floodgates to imports.

There are, of course, other events, trends and forces that have hit smokestack industries. Government regulations, ranging from environmental control to antitrust, have hurt. Tax policies, especially in the area of depreciation of capital assets, have served as much as disincentives to investment and growth as they have incentives. And basic industries, big users of energy, were set back hard by the quadrupling of oil prices in 1973—the effect of which continues through the present.

And, of course, there have been charges of management laxity in basic industries. These charges center on softness in dealing with union wage demands and with not keeping up technologically. But these are largely subjec-

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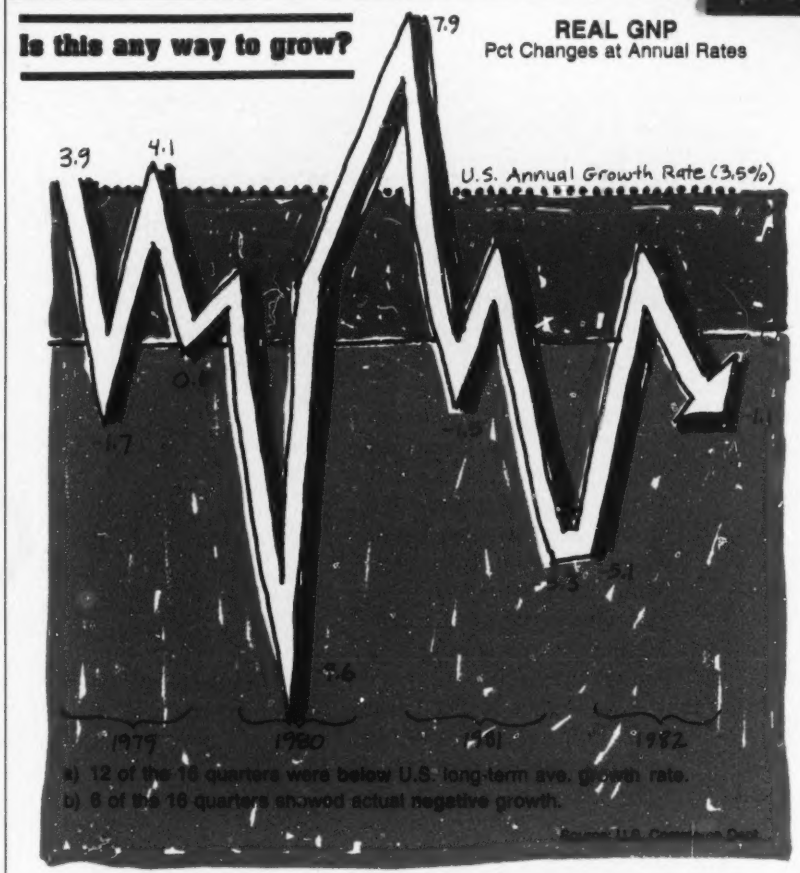

tive criticisms, often difficult, or even impossible, to document. Certainly, the magnitude of the problems faced by management, and the resources at its disposal to resolve the problems, should be fully considered.

So now, what are prospects for basic industries? What government policies are needed to help? What can the industries do themselves?

When experts talk or write about the prospects for smokestack industries in this country, two points seem always to emerge: Slow and volatile U.S. economic growth, and the continuing flood of imports.

To these points is where action must be directed, they say, or the problems of basic industries almost certainly will worsen.

There are good reasons for relating these problems to basic industries. Basic manufacturers are uniquely vulnerable to the kind of economic happenings that have marked the past 10 to 15 years in this country. And too, for very special reasons that will be seen, the import problem has knocked the smokestackers hard as it only tapped others.

First, a look at the badly working U.S. economy of recent years.

In terms of economic growth, a glaring spotlight has been cast on the last 4 years in this country—1979 through 1982. In those years, average annual real economic growth came out to abysmal 0.7 pct. That compares with a U.S. postwar average growth rate of 3.5 pct.

But the basic industries in this country didn't pick up their maladies in just the last 4 years. These were just the years when every ache and pain of Smokestack America suddenly seemed to worsen.

The "new U.S. slow growth economic era," as one economist calls it, can be traced back to 1969. The economy, in the following *14-year period* through 1982, grew at a below-par average annual rate of 2.4 pct.

The last 4 years have been just the tail of this deadly game of economic crack-the-whip.

Basic industries are mature industries. They grow at a slower rate than do most others. So, when the economy is sluggish over a protracted period, as has been true since 1969, these slowgrowers are set up like the number ten pin. They can't slow much without getting bowled over altogether.

Too, these industries are known to be cycle-sensitive. This means their business cycle roller coaster ride goes higher and falls further than does the overall economy—and most other businesses.

This is because their products tend to be high-tag goods, and the purchase of them by customers are often deferrable—at least through a business down cycle.

Also, basic industries, for the most part, operate on a mass-production, or large-scale production, basis. This means that cyclical down swings leave them facing continuing huge overhead costs.

And, of course, basic industries are the last to catch hold of cyclical up swings. They are at the tail end of the buying process that in a recovery starts with retail consumers and finally winds its way to them. Short recovery periods can be deadly to basic industries.

This cycle-sensitive phenomena can be illustrated simply through the tie-in of plant and equipment investment and the overall economy. The fortunes of basic industries, either directly or indirectly, are very closely tied to plant investment.

In 1973, when the U.S. economy grew at a 5.8 pct clip, plant investment rose by a whopping 14.4 pct. In 1975, when the economy dipped by 1.2 pct, investment slumped by 12.1 pct.

So, what has been the look of the business cycle in recent years in terms of volatility--that enemy of cyclical-sensitive basic industries?

In a word—wild!

The last recovery cycle in 1980-81 was the shortest (12 months) in 50 years; the last recession in 1981-82, was the longest (16 months) in 60 years.

One top economist stamps the label, The Widening Cycle, on the last decade. His point is well taken. For example, in the 1948-69 period, some 9 pct of the years had negative growth. In the 1970-82 period, a staggering 38 pct of the years were negative.

"That," says a basic industry executive, "is enough to give almost any company a bad case of economic whiplash."

There is another way that bizarre behavior of the economy has hurt basic industries in recent years. These industries are capital-intensive.

This means that money is the grease that makes their wheels roll smoothly. They are big-scale industries—they carry big inventories. Their equipment

Critical Question:
Is protection against imports needed?

is costly to buy, costly to run. Their huge plants carry a big overhead burden.

And in recent years, the U.S. economy has been bedeviled as never before by soaring inflation and sky-high borrowing costs. Superimpose these facts on a sluggish, bumpy economy that kept basic industries from generating and retaining decent earnings, and the recipe for disaster is apparent enough.

This great squeeze, while in action for many years, was epitomized by the showing in the 1979-82 period. In that time, while the economy grew at a super-sluggish 0.7 pct per year average rate, and when basic industries needed to borrow, the prime lending rate averaged a stratospheric 15.5 pct. These rates were a direct reflection of runaway inflation rates. And inflation could be another whole chapter in the Book of Disaster on Smokestack Industries.

So, the very poor showing of the U.S. economy since 1969—and particularly the 1979-82 crunch years—has hurt basic industries in very special ways. It is not the single cause of the problem of Smokestack America, but it points clearly to being a major one.

The other key cause of the present plight of basic industries is found in the flood of imports. This again, is a problem affecting most all of U.S. industry, but it has hit the basic ones with a special fury.

In the hectic economic period of the late 60's to the early 80's, imports of goods into the U.S. increased 10-fold. During the same time, the U.S. economy grew by only 3-fold. And, as noted, it was imports of basic industry products that spearheaded, and are spearheading, this invasion.

This country has lived long with the import problem and the reasons are clear enough why imports are pouring across the U.S. borders.

Marketplace U.S.A. is the world's biggest and richest single market. It is easy to enter; there are few rules posted on its doors. And foreign industries, often with state of the art products, and almost always with big helping hands from their governments, have moved in in droves.

And, of course, relatively very high U.S. labor costs and slower worker productivity growth, have opened doors wide to imports.

If there has been a bittersweet topping on all this, it has been the recent strong dollar which, in effect, lowers the price of imports.

In all this import invasion, it has been U.S. basic industries that have taken it on the chin harder than most other industries, for several reasons.

Overseas, basic industries were the first rebuilt after the war. This was a needed priority for countries to meet domestic needs at the time. As a consequence, these industries were built up and into importing long before other industries. And, very naturally, their top import target was the big, rich home markets of U.S. basic industries.

Another point. Just about every developed—and even many developing countries—has a steel industry. It is a matter of national pride. So, there have been plenty of countries lined up ready to market steel in this country—and, as often followed, ready to market products made of this basic commodity.

Too, the extraordinarily high labor costs of U.S. basic industries opened those industries wide to imports. It was a special invitation. These costs were—and are—higher than in any other industry and this import vulnerability of basic manufacturers in this country remains.

For example, the average hourly earnings of workers in the U.S. auto industry in 1982 were over $19. This compares to W. Germany's $13 and Japan's $7-plus. In steel, U.S. workers earned about $23 an hour; in W. Germany, $11.50, and in Japan, a bit over $10.

In sum, the causes and problems that have seriously damaged basic industries in this country are clear enough. At this point in time, there appears to be two basic, underlying--and continuing--causes that must be dealt with through national policy and action.

One basic problem is the seeming continuance of years of sluggish U.S. economic growth--years marked at the same time by one wild cyclical swing after another. The other basic problem is imports, which have now created a trade deficit so monstrous that it distorts the entire U.S. economy.

The current economic recovery does not appear to be a solution in process. Says a spokesman for the National Assn. of Manufacturers (NAM): "Even with the recovery now underway, our fundamental economic problems will not go away."

Alexander B. Trowbridge, NAM president, has noted, "The long-term

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Sluggish, bumpy growth hits plant spending—a key market of basic industries

deterioration of American industry that began in the mid-1970's, and has continued through several administrations and Congresses, has *still* not been satisfactorily addressed."

Many—not including the NAM—look for the answer to the problem economy, and to ailing smokestack industries, in industrial policy (IP). This is something that is both vogue and vague. Economist F. Gerard Adams of the University of Pennsylvania's Wharton School describes IP as a "comprehensive and coherent attack on the problems of American industry. It is policies intended to improve industrial productivity and competitiveness..."

An 'umbrella' policy, it includes easing of antitrust regulations to allow industry-strengthening mergers, cooperative R&D efforts and consortiums to help fight foreign competition. It includes special government help for 'sunset' industries and growth-boosting help for 'sunrise' industries. Also usually included are government incentives to boost productivity and to expand exports.

In a sense, IP as popularly envisioned, brings together all the ad hoc moves the government has taken in recent years, adds a few more, and constructs a single industrial policy out of the melange.

Most economists and business executives don't buy the idea of the IP. It smacks mightily of heavy-handed government intervention. Some even see in IP, the emergence of national planning, that old anathema of most Americans. Business executives, especially, don't like the idea of the government picking industry winners and losers.

The whole idea of 'sunrise vs. sunset' industries seems to be losing ground. The 'versus' is increasingly viewed as being meaningless; each needs the other.

Says U.S. Steel Corp. chairman David M. Roderick, "High-technology and basic industries are not competitors, they are compatible because basic industry needs better technology."

Economist Stephen S. Cohen of the University of California, writing recently in the *New York Times*, went further. "Unless American manufacturers—principally those classified as 'sunset'—adopt the new technologies, they will not remain competitive," he noted. "Unless they remain competitive, the high-technology industries will not attain their growth or promise. The workable strategy is to bring high-technology into the production of traditional products."

There's another big objection to IP. It hasn't worked well in a number of countries where it has been tried, including Great Britain and France.

But the key objection to IP is that it can't do anything directly about what appears to be the leading cause of the "deterioration of American industry," to use the words of NAM's Mr. Trowbridge. That is, IP would not be able to get the U.S. economy back onto a growth path marked by less wild cyclical swings. The very best IP will get nowhere if that growth doesn't happen.

What seems to be needed is coordinated fiscal and monetary policies designed to achieve sound economic growth. It is little wonder that the economy—and particularly basic industries—took it on the chin during the last few years.

Often, while the Federal Reserve Board pulled one way with money policy, the Administration pulled the other way with tax policy. On top of that, in less than a two-year period, came the biggest tax cut in U.S. history followed by the biggest tax hike.

The call for coordinated monetary and fiscal policies has been sounded, among others, by economist David B. Yoffie of Harvard. He contends that IP would be "counterproductive for America." But he adds that this does not imply that basic industries are doomed.

"On the contrary," says professor Yoffie, "given the opportunity, many firms in basic industries could thrive. The role of the government should be to provide that opportunity. Coordinated monetary and fiscal policies...could do much more for America's basic industries than the best industrial policy."

What about that other key cause underlying basic industries' problems—imports?

Here, there does seem good reason for the government to jump into the fray.

"I maintain that we need government off our backs at home and by our side abroad," says Bernard J. O'Keefe, chairman of the NAM and chairman of EG&G, Inc. It is said that many 'amens' were sounded by business executives to that succinct comment.

The import problem relates very closely, of course, with the overall eco-

nomic instability of recent years. In commenting on the "instability and uncertainty that has marked the economic environment over the past 10 years," economist Michael J. Piore of MIT, said recently that it has been "largely attributable to the increasing internationalization of markets and the absence of institutions capable of stabilizing the world economy."

Certainly, setting up such institutions is the work of government—U.S. and others—not that of private industry.

It appears that this country's options to deal with the import problem boil down to basic ones. It can build walls, or it can build bridges.

Walls entail levying of higher tariffs, import quotas and other legal barriers to entry of goods into this country. Such policies would be set unilaterally.

Bridges would involve meetings with other countries to settle matters, make arrangements and otherwise arrive at mutually satisfactory agreement on buying and selling each other's goods.

This latter approach would call for strengthening of existing international institutions to facilitate such matters, or even setting up new such institutions.

The 'walls' approach would be straight-out protectionism. In the 'global village' concept in which most economists today view world trade, the 'walls' approach may not be possible much longer. It has served a useful purpose in some cases, but it does risk counterattack by trade competitors.

The recent, 'self-imposed' Japanese quotas on auto exports to the U.S. is an example of where no legal entry barriers were set up. Clearly, to the U.S. auto industry it is valuable knowledge that there will be 1.68 million Japanese-made cars on an annual basis that will enter this country until March of next year.

"International trade is no longer an option for American business—it is a necessity," says NAM executive vice president Forrest I Rettgers. "Without noticing it, we have evolved in the past quarter-century from being a nation that was essentially self-sufficient economically to one that is increasingly de-

Progress has been made in deregulation, but red-tape bind must be loosened more.

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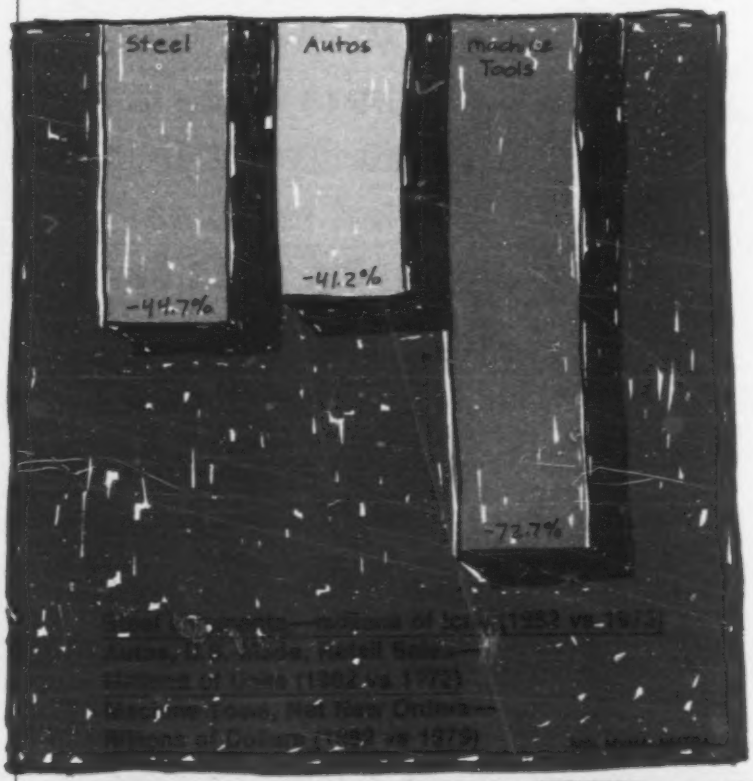
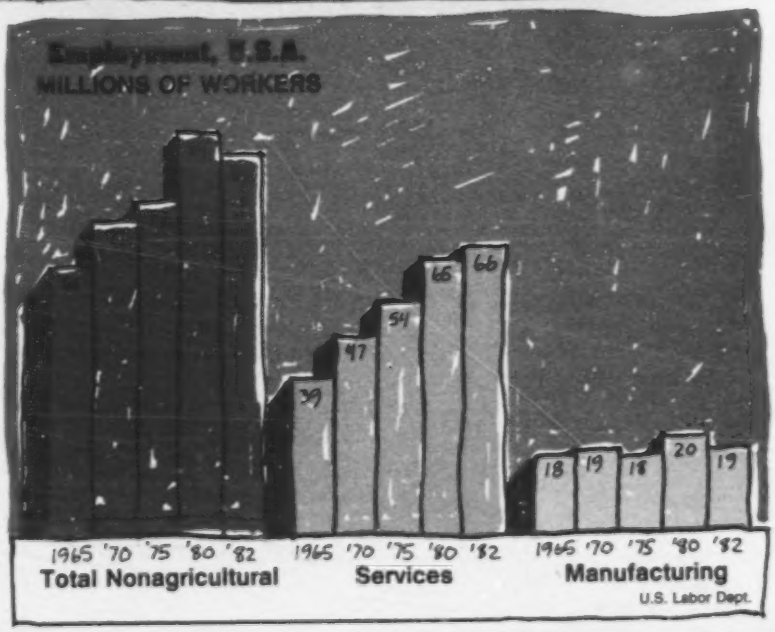
Key basic industries under siege





pendent on the rest of the world. The days of 'Fortress America' are gone."

Even many business executives who have faced the import problem first hand, concur with this view. Says Raymond A. Hay, board chairman and CEO of LTV Corp., "We must reindustrialize in a global environment."

And Union Carbide Corp. president Warren Anderson talks of "the emergence of global interdependence to a heretofore unimagined degree."

The figures bear out this view. From 1970 through 1980, combined U.S. import/export trade more than doubled as a share of the U.S. economy (GNP). This share was 8.3 pct in 1970; 17.5 pct in 1980. And this was not due singularly to a rise in imports. Imports increased ten-fold, but still, exports increased seven-fold. This growth far outpaced growth of the overall U.S. economy which increased three-fold.

On imports, government action is needed. In world trade, U.S. companies often find themselves competing not with foreign companies but with foreign governments. This is one of many issues that must be addressed through international channels. It may be too late for walls, but not for bridges.

In all the talk about ailing Smokestack America, perhaps the most overlooked aspect is what it is doing to help itself.

It is doing a lot; it is on the move. It is taking on a new look as it fights the problems that threaten to topple its smokestacks.

In fact, it likely will be the self-help efforts of basic industries more than anything else that restores them to full health—with perhaps a wholly new profile.

Based on developing trends, the future look of basic industries in this country will likely be smaller scale, leaner, tougher and less distinguishable as smokestack industries at all.

For one, a number of basic industries, notably steel, have had in action for some time what might be called strategies of shrinkage. It is estimated that the steel industry in this country trimmed some 15 pct from its capacity through the time of the last two reces-

Business has become a victim of wild swings in the U.S. economy.

sions.

One steel producer leading in this approach is National Steel Corp. When all its planned restructuring is completed, National will have reduced its steelmaking capacity by nearly 50 pct. Notably, National, in the second quarter this year turned in its first profit on steel operations since the middle of 1981. One analyst says the profit showing was "partly a reflection of a steel structure that has had a drastic scaling down."

There is, of course, method in the madness of steel in its shrinkage strategy. It could be boiled down to the point: Smaller in size, stronger in earnings. And that means being more competitive and more able to renew itself through capital spending.

In labor costs, basic industries have been lately making great and widely-heralded progress. In steel and autos there has been a tone of concessions and givebacks. The effects of progress on the labor front are just now being realized. In steel, manhours needed to produce 1 ton have been cut from 9.6 in 1978 to 8.0 last year, according to one analyst.

Too, diversification has played, and continues to play, a leading role in steel's efforts to stabilize and strengthen itself. This gives a broader corporate base and greater resources to companies with steel operations.

Another point: Basic industries, in order to strengthen themselves, are embracing new technology at a greater rate than ever in the past. Steel companies, for example, are using lasers to check refractory line wear in furnaces. And, increasingly, microcomputers and microprocessors are being used in monitor and control production processes.

The drive for greater use of high technology in basic industries was noted recently by the consulting firm, Arthur D. Little, Inc. The firm forecasts a quadrupling in sales of computerized systems for automated factories to about $100 billion (in 1981 dollars) by 1992.

All this takes more than capital; it also requires courage. This was shown in capital expenditures of steel companies in recession-year 1982. They raised this spending by almost 25 pct over 1981 to $4.2 billion. Says one steel executive, "That shows more than anything the determination of this industry to strengthen itself."

Some of the industry gains that have come from recent capital outlays in steel have been nothing less than dramatic. New continuous annealing lines, for example, are designed to complete in ten minutes an annealing cycle that takes five to ten days with conventional equipment and methods.

The auto industry's push into high-tech has been well publicized. Some 30 pct of this decade's robots are expected to be working in auto plants. That other basic industry, machine tool building, is hard-pressed to upscale and automate its products to meet requirements of its customers—which are often other basic goods manufacturers.

Another strengthening effort by basic industries has been in the alliances of U.S. auto producers with foreign producers. As one Detroit executive puts it, "This builds strength through using the best of the world's capabilities."

These alliances extend to the basic industry of aircraft manufacturing. Boeing and Mitsubishi Heavy Industries of Japan are just one of these alliances.

Not only are basic industries stepping up their modernizing and restructuring on an individual company basis, but they are also joining in formation of increasingly powerful coalitions. Right or wrong, political clout is a necessity in industry-strengthening efforts. Coalitions help form economic policy in this country. They help remove government regulatory blocks from standing in the way of self-help efforts by industries.

There is a Basic Industries Coalition. The smokestack company members

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range from Ford Motor Co. to Scott Paper Co.

There is a Coalition for International Trade Equity that includes basic industry companies such as Cincinnati Milacron and Westinghouse.

There is a Trade Reform Action Coalition that is made up heavily with basic industry companies in metals producing, metalworking, chemicals and textiles.

There is a Metalworking Fair Trade Coalition.

The list could go on. Most coalitions are targeted on the fair trade issue. But they also plump for other issues affecting basic industries.

Some of these 'rainbow' efforts are leading to pots of gold. One example seems clearly to be the formation of an advisory committee formed last month by President Reagan to come up with recommendations to revitalize the American steel industry.

And very importantly, coalitions have done much to 'educate' government antitrustors in the need for some new ground rules in that area. A case in point: The Justice Dept.'s Antitrust Division head, William F. Baxter, is now emphasizing the importance of antitrust law "for improving international competitiveness."

That's a radical departure from the old antitrust position of hard-lining against bigness and concentrating solely on competitive effects in domestic business.

This new attitude may lead to a wave of rationalized investment in basic industries. The permitting of combinations of corporations in an industry, or cooperation of several companies in one industry, might eventually do more to strengthen U.S. basic industries than any other single factor, say a number of economists.

So, Smokestack America lately has made real progress. And if government 'intervention' in their cause is confined to pushing, and not blocking, then there is promise for much greater progress.□

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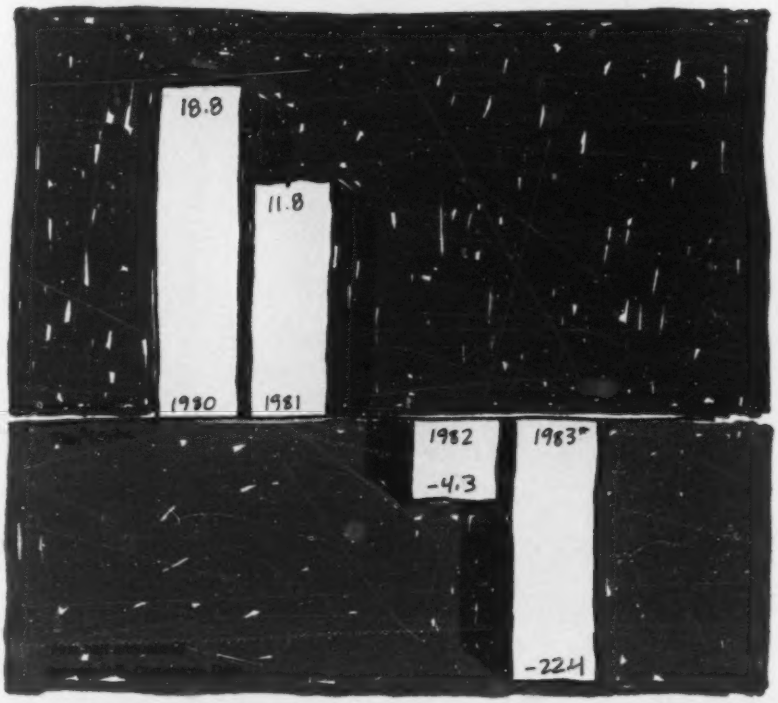
The long-time U.S. trade weakness finally catches up with traditionally strong manufacturing trade



U.S. Shares of World Exports, %

	1970	1980
Total U.S. Exports	13.7%	10.8%
Iron & Steel	9.2	5.0
Machine Tools	18.1	11.7
Aircraft	67.3	53.0
Electrical Machinery	18.7	10.1
Office Machines & Computers	38.4	28.4
Semiconductors	39.5	22.7

METALWORKING ORDER TRENDS

Orders bounce a lot, but still hold to recovery path

July was a disappointing month for orders, mainly because June was such a big month for orders.

Orders received by durable goods manufacturers fell by 3.5 pct in July to $87.7 billion. This month-to-month decline followed a whopping near-8 pct rise in June to $90.9 billion.

The wild ride through the economic rapids of a recovery period was seen even more clearly in July orders received by the capital goods sector of durables manufacturing.

Orders for capital goods rose 5 pct between May and June. But in July, these orders were down 11 pct from June—to $21.6 billion.

A broader look than a 30-day glimpse is needed these days to get a handle on the orders trend.

Orders through the first seven months of the year were up 6.6 pct. Another view: July orders were up 13 pct from the year's low point of $77.4 billion in February.

Those measures point to modest recovery strength in orders, a recovery that started in November of last year.

Increases in orders in July were racked up by the primary metals and electrical machinery industries.

Machinery builders posted a 7.6 pct gain during the month to $14.5 billion. Here, the strength was in the electronic components category.

The July orders increase for primary metals was mostly in the steel industry. Its orders were up 7.1 pct to $4.2 billion.

The big dipper in July was the transportation equipment industry. Orders were down 13.1 pct to $20.4 billion. This followed a 28 pct increase in June. The volatile aircraft and parts industry accounted for most of the July orders decline in transportation equipment.

Inventories continued to shrink in durable goods lines in July. This is a good sign for the near future; the shrinkage in stockpiles points to near-at-hand stock replenishment orders.

The inventory/orders ratio for durable goods manufacturers in July was 20 pct lower than in the year-ago month. The July ratio was 1.93. Normally, in a recovering economy, any ratio below 2.0 indicates a near-term spending binge to rebuild inventories.

Traditionally, stock rebuilding is good news. But there's a catch now. Commerce Secretary Malcolm Baldrige has warned that stock rebuilding at this time "could put upward pressure on interest rates if government borrowing isn't reduced quickly."

Source: U.S. Dept. of Commerce Billions of dollars, seasonally adjusted monthly total, unless otherwise noted		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
Capital Expenditures (Annual Rates)				
U.S. Industry, Total	2nd Qtr.	$302.2*	$302.3	$323.2
Manufacturing, Total	2nd Qtr.	111.3*	112.8	123.8
Manufacturing, Durable Goods	2nd Qtr.	50.9*	52.8	59.0
Mining Industry	2nd Qtr.	14.6	14.6	16.6
Key Indicators, Durable Goods Manufacturing				
New Orders	July	87.7	90.9	75.6
Shipments	July	85.6	86.6	76.9
Inventories	July	169.7	169.8	182.0
Unfilled Orders	July	307.5	305.4	301.1
New Orders, Metalworking				
Capital Goods Producers, Nondefense Industries	July	21.6	24.3	19.9
Capital Goods Producers, Defense Industries	July	6.7	7.9	5.2
Primary Metals, Total	July	10.3	10.1	8.7
Steel (SIC 331)	July	4.2	3.9	3.9
Iron & Steel Castings (SIC 332)	July	1.0	1.1	1.3
Nonferrous Metals	July	5.1	5.1	3.5
Nonelectrical Mach.-Equip. Industries, Total	July	14.8	15.5	12.9
Engines & Turbines	July	0.9	0.8	0.9
Farm Machinery & Equipment (Shipments)	July	0.9	0.9	0.9
Construction, Mining & Materials Hdlg. Equip.	July	2.5	2.5	2.5
General Industrial Machinery	July	1.2	1.1	1.1
Fluid Power Equipment** (Index-1972=100)	July	223	249	153
Metalworking Machinery	July	0.7	0.6	0.6
Machine Tools, Total (Millions $, unadjusted)***	July	173.4	145.3	106.6
Machine Tools, Metal-Cutting***	July	127.0	96.5	70.4
Machine Tools, Metal-Forming***	July	46.4	48.8	36.2
Electrical Mach. & Equip. Industries, Total	July	14.5	13.4	12.5
Elec. Transmission Equip. & Industrial Apparatus	July	1.7	1.9	1.7
Household Appliances	July	1.3	1.2	1.0
Communication Equipment	July	4.2	4.6	4.3
Transportation Equip. Industrial, Total	July	20.4	23.4	17.2
Motor Vehicles & Parts (Shipments)	July	12.4	12.8	10.7
Aircraft, Missiles & Parts	July	5.2	8.5	4.9
Shipbuilding & Military Tanks	July	1.7	1.2	0.9
Fabricated Metal Products, Total	July	9.9	10.1	9.1
Instruments, Total	July	4.5	4.3	4.0

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA.

EFFECTIVE SEPTEMBER 12, 1983

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	175	174	159	123
Buffalo	30	28	31	27
Pittsburgh	184	199	204	125
Youngstown	94	98	90	62
Cleveland	141	135	128	106
Detroit	97	114	141	117
Chicago	472	468	453	358
Cincinnati	97	95	83	76
St. Louis	64	78	74	38
Southern	136	138	139	74
Western	93	87	88	67
U.S. Production	1,583	1,614	1,590	1,173

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective September 12, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,583	1,614	56,339	53,765
Capability Utilization Rate	55.0	56.1	53.9	50.4

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 9/1/83)	26.822	26.217	26.217	25.297
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 77.17	$ 76.83	$ 75.17	$ 56.50
No. 2 bundles	$ 45.50	$ 45.50	$ 45.50	$ 41.83
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh .	$ 82.50	$ 82.50	$ 79.50	$ 57.50
No. 1 steel, Philadelphia	69.50	68.50	68.50	59.50
No. 1 steel, Chicago.....	79.50	79.50	77.50	52.50
No. 1 bundles, Detroit..	75.50	75.50	71.50	51.50
Low Phos., Youngstown	84.50	84.50	79.50	63.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	71.50
No. 1 mach'y cast., Phila	95.50	95.50	95.50	100.50
No. 1 mach'y cast., Chi..	109.50	109.50	108.50	105.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective September 12, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00-81.00 (Nom.)	76.00	8/29/83
Copper (C)	76.00	75.50-76.00	9/2/83
Lead	20.00-21.50	20.00-21.50	8/31/83
Magnesium Ingot	138.00	134.00-138.00	6/1/83
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	46.00	43.00-46.00	8/30/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. delivered. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $215.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $178.00
Bismuth, ton lots ..... $1.65-$1.75
Cadmium, ton lots $1.25
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $415.75
Indium, dollars per troy oz. ..... $3.20-$3.50
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. .. $285-$299
Molybdenum, lb. tech. moly oxides, 20.lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $12.23
Vanadium $4.94
Zirconium sponge ..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Sept. 5—Holiday
Sept. 6—585.72
Sept. 7—585.88
Sept. 8—587.04
Sept. 9—588.83

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	72⅜	66½
Yellow brass	63¼	60
Red brass	67¾	62¾
Comm. bronze	69¼	64
Mang. bronze	64⅛	61¾
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	69
No. 2 copper wire	60
Light copper	51

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	65
No. 2 copper wire	56
Light copper	47
No. 1 composition	56
No. 1 comp. turnings	54
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	29
Radiators	46

Aluminum

New mixed clips	51	—52
Old sheet	49	—50
Old cast	49	—50
Clean dry borings	48	—49

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	41	—42
Mixed L.C. clips	35	—36
Old sheets and cast	33	—34
Borings and turnings	24	—25
Duraluminum clippings	29	—30

Copper and Brass

No. 1 copper wire	59	—60
No. 2 copper wire	52	—53
Light copper	46	—47
Radiators	37	—38
No. 1 composition	48	—49
No. 1 composition turn'gs	45	—46
Cocks and faucets	32	—33
Clean heavy yellow brass	30	—31
Brass Pipe	32	—33
New soft brass clippings	46	—47

Lead

Heavy soft lead	8	— 9
Whole batteries	3	— 4
Type metal	15	—16
Electrotype	13	—14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	50	— 60

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

EFFECTIVE SEPTEMBER 12, 1983

MATERIALS NEWSFRONT

(Effective September 12, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 82.00	to	$ 83.00
No. 2 hvy. melting	72.00	to	73.00
No. 1 dealer bundles	99.00	to	100.00
No. 1 factory bundles (auto)	97.00	to	98.00
No. 2 bundles	51.00	to	52.00
No. 1 busheling	94.00	to	95.00
Machine shop turn.	7.00	to	8.00
Shoveling turnings	26.00	to	27.00
Cast iron borings	25.00	to	26.00
Low phos. punchings plate	99.00	to	100.00
Heavy turnings	72.00	to	73.00
No. 1 RR hvy. melting	90.00	to	91.00
Rails 2 ft. and under	103.00	to	104.00
Scrap rails, random lgth.	91.00	to	92.00
RR specialties	98.00	to	99.00
No. 1 machinery cast	74.00	to	75.00
Cupola cast	67.00	to	68.00
Heavy breakable cast	30.00	to	31.00
Stainless			
18-8 bundles and solids	600.00	to	610.00
18-8 turnings	500.00	to	510.00

Chicago

No. 1 hvy. melting	$ 79.00	to	$ 80.00
No. 2 hvy. melting	72.00	to	73.00
No. 1 dealer bundles	99.00	to	100.00
No. 1 factory bundles (auto)	99.00	to	100.00
No. 2 dealer bundles	44.00	to	45.00
No. 1 busheling	97.00	to	98.00
Shredder scrap	84.00	to	85.00
Machine shop turn.	25.00	to	26.00
Mixed bor. and turn.	25.00	to	26.00
Shoveling turnings	31.00	to	32.00
Cast iron borings	44.00	to	45.00
Low phos. forge crop	99.00	to	100.00
Low phos. punchings plate ¼ in. and heavier	109.00	to	110.00
Low phos. 2 ft. and under	105.00	to	106.00
No. 1 RR hvy. melting	94.00	to	95.00
Scrap rails, random lgth.	81.00	to	82.00
Reroller rails	95.00	to	96.00
Rails, 2 ft. and under	102.00	to	103.00
RR couplers and knuckles	87.00	to	88.00
RR car axles	114.00	to	115.00
No. 1 machinery cast	109.00	to	110.00
Cupola cast	97.00	to	98.00
Stove plate	92.00	to	93.00
Steel car wheels	96.00	to	97.00
Stainless			
18-8 bundles and solids	570.00	to	580.00
18-8 turnings	470.00	to	480.00
430 bundles and solids	135.00	to	140.00
430 turnings	100.00	to	105.00

Philadelphia

No. 1 hvy. melting	$ 68.00	to	$ 71.00
No. 2 hvy. melting	55.00	to	58.00
No. 1 dealer bundles	80.00	to	83.00
No. 2 dealer bundles	39.00	to	42.00
No. 1 busheling	80.00	to	83.00
Shredder scrap	82.00	to	85.00
Machine shop turn.	23.00	to	26.00
Mixed bor. and turn.	23.00	to	26.00
Shoveling turnings	41.00	to	44.00
Low phos. 5 ft. and under	79.00	to	82.00
Low phos. 2 ft. punchings	92.00	to	95.00
Electric furnace bundles	93.00	to	96.00
RR specialties	81.00	to	84.00
Rails, 2 ft. and under	92.00	to	95.00
Cupola cast	60.00	to	63.00
Heavy breakable cast	53.00	to	56.00
No. 1 machinery cast	94.00	to	97.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 59.00	to	$ 60.00
No. 2 hvy. melting	57.00	to	58.00
No. 1 dealer bundles	75.00	to	76.00
No. 2 bundles	37.00	to	38.00
No. 1 busheling	73.00	to	74.00
Drop forge flashings	49.00	to	50.00
Machine shop turn.	30.00	to	31.00
Mixed borings and turn.	19.00	to	20.00
Shoveling turnings	30.00	to	31.00
Cast iron borings	27.00	to	28.00
Heavy breakable cast	35.00	to	36.00
Mixed cupola cast	51.00	to	52.00
Automobile cast	74.00	to	75.00
Stainless			
18-8 bundles and solids	470.00	to	480.00
18-8 turnings	350.00	to	360.00
430 bundles and solids	115.00	to	125.00

Youngstown

No. 1 hvy. melting	$ 71.00	to	$ 74.00
No. 2 hvy. melting	49.00	to	52.00
No. 1 dealer bundles	87.00	to	90.00
No. 2 dealer bundles	37.00	to	40.00
Machine shop turn.	3.00	to	5.00
Shoveling turnings	7.00	to	10.00
Low phos. plate	83.00	to	86.00
Electric furnace bundles	78.00	to	81.00
Galvanized bundles	70.00	to	73.00

Cleveland

No. 1 hvy. melting	$ 67.00	to	$ 70.00
No. 2 hvy. melting	32.00	to	35.00
No. 1 dealer bundles	85.00	to	88.00
No. 1 factory bundles	92.00	to	93.00
No. 2 bundles	22.00	to	25.00
No. 1 busheling	84.00	to	87.00
Machine shop turn.	1.00	to	4.00
Mixed bor. and turn.	1.00	to	4.00
Shoveling turnings	3.00	to	6.00
Cast iron borings	6.00	to	9.00
Cut structural & plates, 2 ft. and under	99.00	to	102.00
Low phos. punchings plate	99.00	to	102.00
Drop forge flashings	37.00	to	40.00
Foundry steel, 2 ft. & under	57.00	to	60.00
No. 1 RR hvy melting	77.00	to	80.00
Rails, 2 ft. and under	105.00	to	108.00
Rails, 18 in. and under	106.00	to	109.00
Steel axle turnings	67.00	to	70.00
Railroad cast	80.00	to	83.00
No. 1 machinery cast	87.00	to	90.00
Cupola cast	60.00	to	63.00
Stove plate	45.00	to	48.00
Stainless			
18-8 bundles	325.00	to	335.00
18-8 turnings	275.00	to	285.00
430 bundles	80.00	to	85.00

Buffalo

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 58.00	to	$ 59.00
No. 2 hvy. melting	47.00	to	48.00
No. 1 busheling	71.00	to	72.00
No. 1 dealer bundles	71.00	to	72.00
No. 2 bundles	30.00	to	31.00
Machine shop turn.	12.00	to	13.00
Mixed bor. and turn.	13.00	to	14.00
Shoveling turnings	17.00	to	18.00
Cast iron borings	12.00	to	13.00
Low phos. plate	71.00	to	72.00
Structural and plate, 2 ft. and under	70.00	to	71.00
Rails, 2 ft. and under	82.00	to	83.00
Scrap rails, random lgth.	65.00	to	66.00
No. 1 machinery cast	67.00	to	68.00
No. 1 cupola cast	48.00	to	49.00

St. Louis

No. 1 hvy. melting	$ 69.00	to	$ 70.00
No. 2 hvy. melting	58.00	to	59.00
Foundry steel, 2 ft.	57.00	to	58.00
No. 1 dealer bundles	69.00	to	70.00
No. 2 bundles	55.00	to	56.00
Machine shop turn.	17.00	to	18.00
Shoveling turnings	24.00	to	25.00
Cast iron borings	35.00	to	36.00
No. 1 RR hvy. melting	79.00	to	80.00
Rails, random length	76.00	to	77.00
Rails, 18 in. and under	92.00	to	93.00
RR specialties	85.00	to	86.00
Cupola cast	70.00	to	71.00
Heavy breakable cast	48.00	to	49.00
Stove plate	75.00	to	76.00
Cast iron car wheels	49.00	to	50.00
Rerolling rails	97.00	to	98.00
Unstripped motor blocks	57.00	to	58.00

Birmingham

No. 1 heavy melting	$ 70.00	to	$ 71.00
No. 2 heavy melting	64.00	to	65.00
No. 1 dealer bundles	71.00	to	72.00
No. 2 bundles	50.00	to	51.00
No. 1 busheling	71.00	to	72.00
Shredder scrap	87.00	to	88.00
Machine shop. turn.	24.00	to	25.00
Shoveling turnings	32.00	to	33.00
Cast iron borings	33.00	to	34.00
Electric furnace bundles	67.00	to	68.00
Elec. furnace, 3 ft. & under	64.00	to	65.00
Structural and plate, 2 ft.	94.00	to	95.00
Structural and plate, 4 ft.	90.00	to	91.00
No. 1 RR hvy. melting	71.00	to	72.00
Scrap rails, random lgth.	81.00	to	82.00
Rails, 18 in. and under	94.00	to	95.00
Angles and splice bars	88.00	to	89.00
No. 1 cupola cast	84.00	to	85.00
Unstripped motor blocks	64.00	to	65.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 62.00	to	$ 63.00
No. 2 hvy. melting	57.00	to	58.00
No. 1 dealer bundles	71.00	to	72.00
No. 2 bundles	30.00	to	31.00
Machine shop turn.	7.00	to	8.00
Shoveling turnings	10.00	to	11.00
Cast iron borings	14.00	to	15.00
Low phos. 18 in. and under	87.00	to	88.00
Rails, random length	70.00	to	71.00
Rails, 2 ft. and under	88.00	to	89.00
No. 1 cupola cast	67.00	to	68.00
Heavy breakable cast	34.00	to	35.00
Drop broken cast	80.00	to	81.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00	to	$ 35.00
No. 2 hvy. melting	30.00	to	32.00
No. 2 dealer bundles	22.00	to	23.00
Mixed bor. and turn.	7.00	to	8.00
Machine shop turn.	4.00	to	5.00
Shoveling turnings	10.00	to	12.00
Clean cast. chem. borings	34.00	to	35.00
No. 1 machinery cast	89.00	to	90.00
Mixed yard cast	38.00	to	39.00
Heavy breakable cast	14.00	to	15.00
Stainless			
18-8 prepared solids	490.00	to	510.00
18-8 turnings	390.00	to	410.00
430 prepared solids	70.00	to	80.00
410 solids	60.00	to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 45.00	to	$ 47.00
No. 2 hvy. melting	35.00	to	37.00
No. 1 dealer bundles	57.00	to	59.00
No. 2 bundles	31.00	to	33.00
No. 1 busheling	57.00	to	59.00
Shredder scrap	57.00	to	59.00
Machine shop turn.	5.00	to	7.00
Shoveling turnings	9.00	to	11.00
No. 1 machinery cast	95.00	to	100.00
Mixed cupola cast	30.00	to	32.00
Heavy breakable cast	8.00	to	10.00

San Francisco

No. 1 hvy. melting	$ 42.00	to	$ 44.00
No. 2 hvy. melting	34.00	to	36.00
No. 1 dealer bundles	29.00	to	31.00
No. 2 dealer bundles	13.00	to	15.00
Machine shop turn.	6.00	to	8.00
Cast iron borings	6.00	to	8.00
No. 1 cupola cast	85.00	to	87.00

Los Angeles

No. 1 hvy. melting	$ 40.00	to	$ 42.00
No. 2 hvy. melting	29.00	to	31.00
No. 1 dealer bundles	27.00	to	29.00
No. 2 dealer bundles	10.00	to	12.00
Machine shop turn.	6.00	to	8.00
Shoveling turnings	10.00	to	12.00
Cast iron borings	6.00	to	8.00
Elec. furnace, 1 ft. and under (foundry)	85.00	to	87.00
No. 1 cupola cast	87.00	to	89.00

Seattle

No. 1 hvy. melting	$ 59.00	to	$ 61.00
No. 2 hvy. melting	48.00	to	50.00
No. 2 bundles	38.00	to	40.00
No. 1 cupola cast	94.00	to	96.00
Mixed yard cast	81.00	to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 60.00
No. 2 heavy melting cut 2 ft. and under	57.00
No. 1 dealer bundles	65.00
No. 2 bundles	35.00
Mixed steel scrap	39.00
Bush. new fact. prep'd.	63.00
Bush. new fact. unprp'd.	55.00
Machine shop turn.	30.00
Short steel turn.	33.00
Mixed bor. and turn.	20.00
Cast scrap	53.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 76.00	to	$ 77.00
No. 2 hvy. melting	58.00	to	60.00
No. 2 bundles	37.00	to	38.00
Machine shop turn.	21.00	to	22.00
Crushed turnings	39.00	to	41.00
Shredder scrap	76.00	to	77.00
Cut structural plate 2 ft. and under	91.00	to	94.00
Unstripped motor blocks	57.00	to	59.00
Cupola cast	78.00	to	80.00

Chilton's

OCTOBER 3, 1983

IRON AGE

THE MAGAZINE FOR METAL PRODUCING MANAGEMENT

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FOURTH QUARTER FORECAST:
THE FAST RUN IS OVER—NOW FOR THE LONG HAUL

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IRON AGE

OCTOBER 3, 1983

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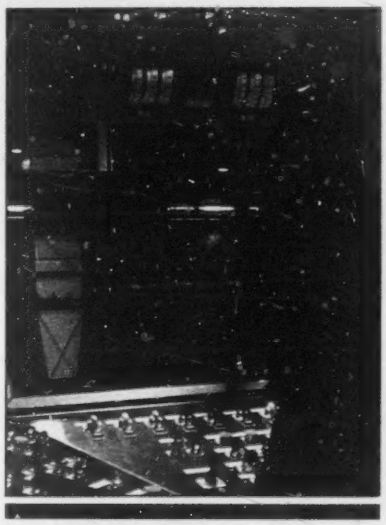

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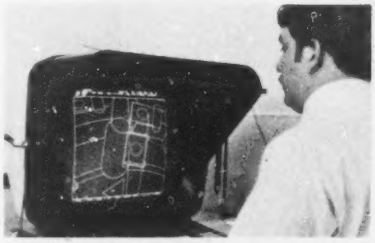

Industrial data base: The key to productivity in the factory of the future.

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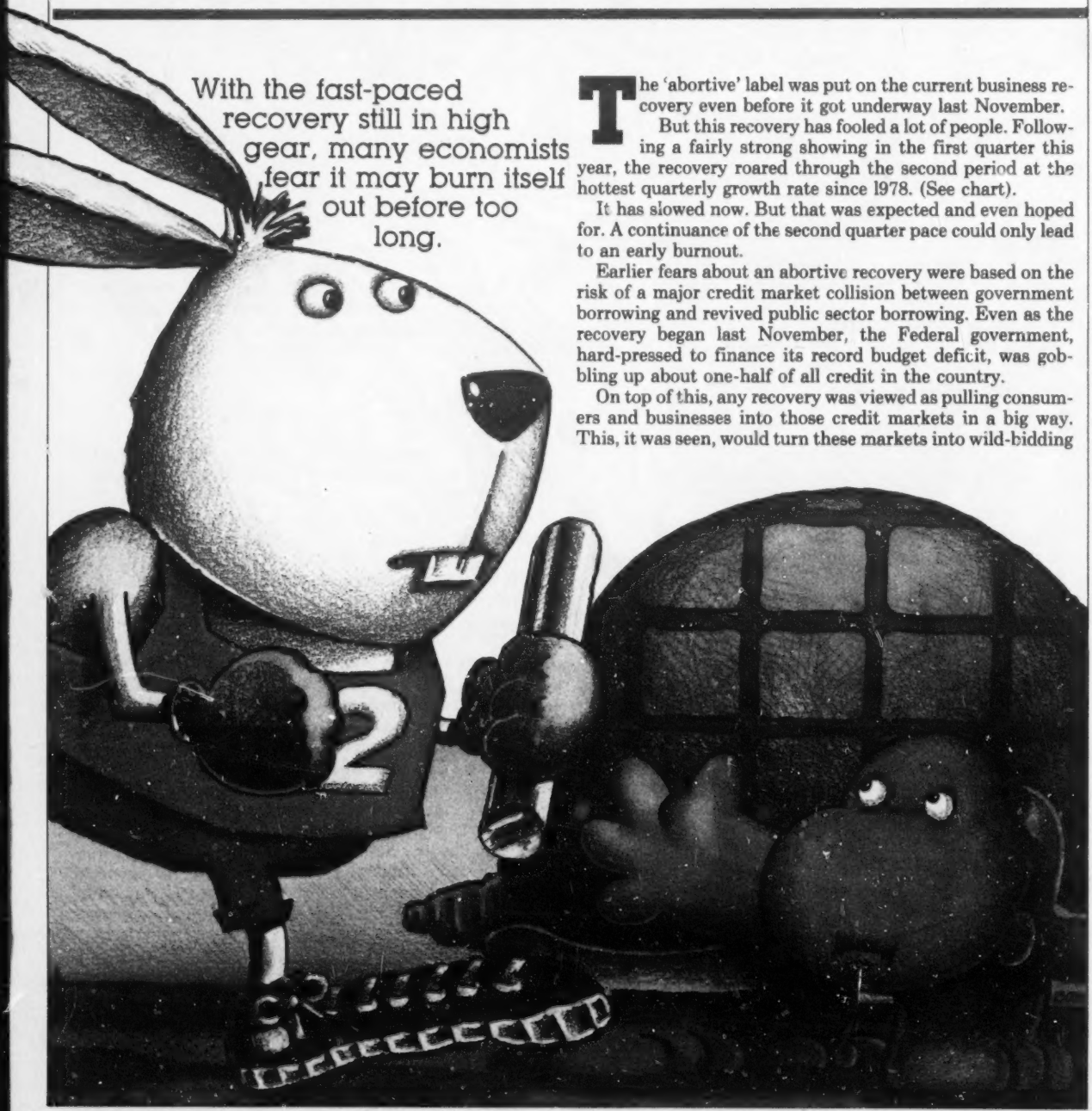
THE FAST RUN IS OVER— NOW FOR THE LONG HAUL

With the fast-paced recovery still in high gear, many economists fear it may burn itself out before too long.



The 'abortive' label was put on the current business recovery even before it got underway last November.

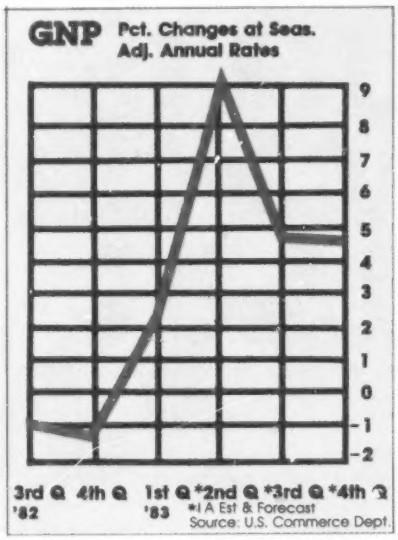
But this recovery has fooled a lot of people. Following a fairly strong showing in the first quarter this year, the recovery roared through the second period at the hottest quarterly growth rate since 1978. (See chart).

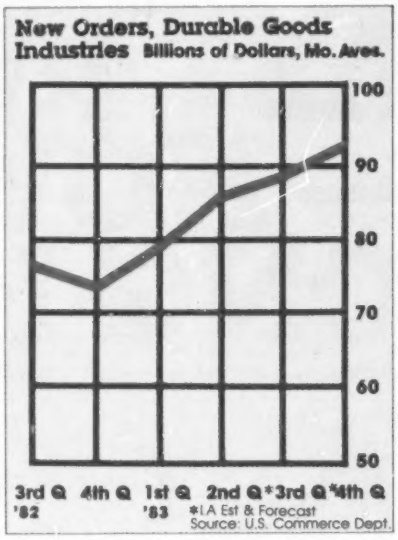
It has slowed now. But that was expected and even hoped for. A continuance of the second quarter pace could only lead to an early burnout.

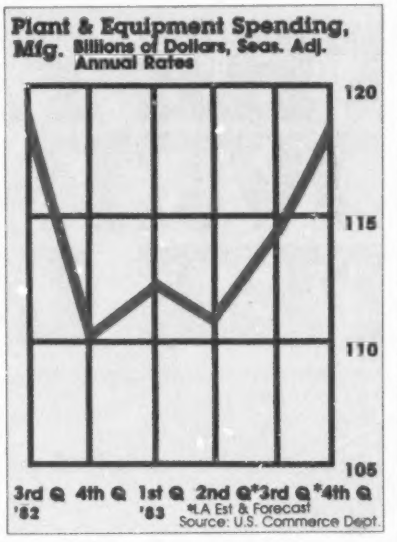
Earlier fears about an abortive recovery were based on the risk of a major credit market collision between government borrowing and revived public sector borrowing. Even as the recovery began last November, the Federal government, hard-pressed to finance its record budget deficit, was gobbling up about one-half of all credit in the country.

On top of this, any recovery was viewed as pulling consumers and businesses into those credit markets in a big way. This, it was seen, would turn these markets into wild-bidding

QUARTERLY FORECAST







auctions with interest rates being pushed through the roof again.

Then...goodbye recovery!

That scenerio has not been played. At least, not yet. And now, there is good reason to believe that drama will not be played out as there is to believe it will come about-at any time.

In short, the recovery could turn out to be a fooler. As one economist wryly notes, "It may be just another in a long line of foolers. We haven't been calling the shots very well over the last few business cycles."

Fears aside, the plain fact is that interest rates over the past three quarters have not taken off even as:

The budget deficit hit record levels;

the trade deficit went deeper into the red than ever in history;

the dollar skyed to levels never before seen.

It seems this recovery has a life of its own. Right now, at least, it appears the recovery will live out that life regardless of all the frets, fears and foibles that surround it.

As has been seen in just about all recoveries, the current one was ignited by consumer buying. This time around, consumers have been spending all they earn, and then digging deep into their savings so they could spend even more.

More than that, consumers in July swelled their net instalment debt by $4.8 billion. That was the biggest monthly increase in such debt since the government began keeping records on it back in 1943.

Consumer spending in the second quarter, in real terms, rose at an annual rate of almost 10 pct. This was the largest quarterly increase in almost 20 years. Savings, as a percent of real disposable income, fell to 4.0 pct-the lowest savings rate since 1950.

All this spending fervor has pushed orders back through the supply pipelines to factories.

New orders received by durable goods producers in July, at $87.7 billion, were up 24 pct from their recession low point of last October. Industrial production in July was up 10.2 pct from its low point of last November-a rollup covering 8 straight months.

No recovery parade is a full-fledged one until business capital spending joins its ranks. As of the second quarter, this happened.

In the June quarter, while the economy grew at an annual rate of 9.2 pct, and consumer spending rose by 9.7 pct, business capital outlays went up 5.9 pct.

Plant outlays are expected to improve as the year moves on. Still, they will be down an estimated 3.1 pct for the full year compared to 1982. That would result in unprecedented back-to-back years of decline in business fixed investment.

Expenditures came to $321.5 billion in 1981, $316.4 billion last year and are expected to come in at $306.6 billion this year. The figure for this year is that given to the U.S. Commerce Department by business executives in the latest survey taken in July and August.

Capital appropriations by the nation's 1000 largest manufacturers were up in the second quarter by 17.6 pct, according to the Conference Board's latest quarterly survey. (That is for non-petroleum firms. If petroleum firms are included, the rise was 3.9 pct).

The other sign pointing to an increase in investment volume is the previously noted in Commerce's survey of executives' spending plans. Notably, while spending for the year 1983 will be down from a sour 1982, the rate of spending will be progressively stepped up.

So, capital spending will be joining the recovery parade, and will be enhancing the durability of the recovery. But it will take time for plant investment to mature. If the recovery does abort for any reason-as many still fear-capital investment could possibly not blossom at all in this cycle.

In the larger economic setting in which metals producing and metalworking industries will be operating through the rest of this year, most economists read good signs.

The current quarter will be the fourth straight one showing real growth. Plant capacity utilization rates are running at about 77 pct, up from a recession low point of 62.3 pct last November. The rate has now gone up for 8 straight months.

Importantly, a head of steam to support the economy through 1984 is shaping up in corporate profits. In the second quarter, after-tax earnings were up 15 pct from the opening period.

The profit gain is really better than it looks. The quality of profits has improved as inflation rates have diminished. This has happened because reported profits don't have anywhere near the 'bloat' they previously had in inventory valuations and depreciation. In short, inflation-created 'paper profits' aren't there as they were for a long time. □

John Baxter

QUARTERLY FORECAST

Steel

The steel market is probably trending upward.

Sheet products, after a summer dip, have come back nicely. Improved orders for bars and some tubular products suggest that the recovery is broadening.

This activity should lift steel shipments from about 17 million tons in the third quarter to about 18 million tons in the fourth quarter. When steel people look back on 1983, it will probably be clear that a slow, steady recovery continued in the fourth quarter.

As of late September, however, the only clear picture was that the volume of sheet producers had risen sharply. This rise is powered by the auto industry and depends on the daily car sales of auto companies.

There has been no significant improvement in the demand for plates, structurals and other products tied to capital spending. In the absence of such an improvement, the steel industry recovery has to be considered partial and fragile. With the December slowdown not too far off and auto sales lagging a little, it's possible the recovery will be aborted.

It's also possible that steel imports may be due for another surge. More than 1.4 million tons of steel were imported in July. That was the highest total since August 1982. A growing concern is the tonnage coming from developing nations. The 558,000 tons from these countries in July exceeded the totals of Japan and Europe.

In addition, Canada shipped 214,000 tons into the U.S. That wasn't too far below the 297,000 tons from Europe. The volume from Canada and developing nations figures to strain the agreement limiting European tonnage and any voluntary restraint by the Japanese.

Domestic trade specialists hear reports that larger quantities of foreign steel are on their way to the U.S. Further strains may develop if the proposed agreement between United States Steel Corp. and British Steel Corp. goes through. This calls for 3 million tons of semifinished material a year to be shipped to U.S. Steel's Fairless Works.

The U.S. Commerce Department has noted that this tonnage would nearly double the volume imported from Europe. The effect, said a Commerce official, could wipe out the current agreement on European tonnage.

In the domestic market, the sheet situation is puzzling. Most sheet producers say they are solidly booked for the next 45 days on cold rolled and galvanized sheet. There are reports that two or more mills are having production problems and have fallen behind on deliveries. General Motors Corp. has lost production due to late deliveries. One General Motors stamping plant recently ran completely out of one-sided galvanized sheet.

Nevertheless, the sheet mills are having trouble collecting prices. There is a general lack of enthusiasm about the market picture. This is partly due to the weakness of the non-sheet business; most of the sheet producers have other products.

But in the past, the auto industry almost singlehandedly had produced steel booms. In peak 1979 months, more than 2 million tons of steel were taken in by auto plants. That compares with 1 million tons in June, the best month for which 1983 figures are available.

The puzzle is why there should be a tight supply and full books with demand running at only about half of past capacity. Part of the answer may be that today's capacity is considerably less than that of a few years ago. National Intergroup, for one, has cut its effective capacity by 50 pct. Others are determined to use only their most efficient facilities.

Another explanation may be that the whole supply chain for sheet is reacting slowly to the transition from a depressed state to a moderately strong market.

The steel companies have reduced their inventories and want to keep them down. Pricing problems are blamed partly on the fact that some mills found themselves with excess inventory and a shortage of cash. The inventory was forced on the market by cutting prices.

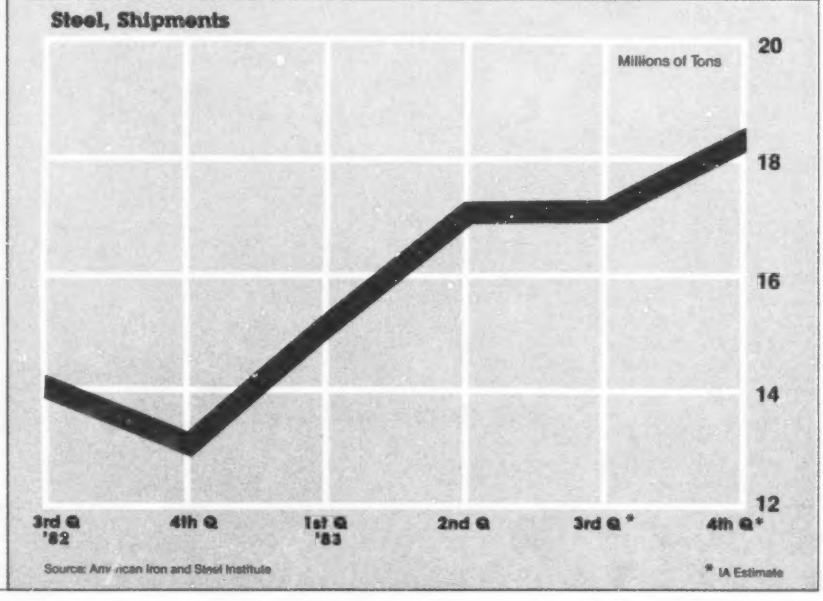
On an overall basis, the steel industry is still depressed. Shipments for the past six months have been at an annual rate of 68 million tons. The fourth quarter will be only a little better and the full year is expected to come in at about 67 million tons.

That isn't enough business to support an industry that has shipped 110 million tons in past peak years and is supposedly capable of shipping 100 million tons today. Inevitably, there are reports of further plant shutdowns and personnel cuts.

The latest report has U.S. Steel shutting down South Works in Chicago and its National and Duquesne plants near Pittsburgh. Permanent job cuts ranging from 5,000 to 10,000 are supposedly in the offing.

To all intents and purposes, some of the affected plants are already down. National Works, which makes pipe and tubing and has been hard hit by the oil country slump, has only 170 active workers. That is down from a normal complement of more than 3,500.

The layoffs have given an unreal quality to some of the labor discussions taking place. At National Works, union members are unhappy with concessions being sought by management. Since most of the union people are idle, it doesn't seem that either side has much to gain or lose.



QUARTERLY FORECAST

Nonferrous

The U.S. business recovery hasn't spread its benefits evenly in the nonferrous metals sector, but laggards like copper, nickel and lead still have some potential for catching up during the fourth quarter.

Aluminum and zinc have been the major beneficiaries of the gradually improving consumption rate by major consuming industries. Both also had been showing a good price recovery rate going into the post-Labor Day stretch. That is expected to carry through to the end of the year.

Copper and nickel were stalled by the narrow focus of the business recovery, which has been most evident in the consumer market and all but invisible in the capital goods sector, which usually picks up the beat in the final third of the year.

The aluminum producers entered September with their published prices for the base 99.5 pct primary unalloyed ingot up to 81¢ per lb. This is one cent higher than the level one domestic producer had reached in 1981, just before the roof started to fall in. Late last year, primary ingot was freely available at and below 45¢ per lb and the sharp recovery in market prices reflects a number of factors, including a low U.S. production rate, some augmenting open market purchases by some domestic producers, a steady downtrend in inventories and a improving industrial chewup rate.

Domestic production has been increasing since before midyear, but the producers still aren't likely to catchup to last year's total until well into the fourth quarter. Meanwhile, there is talk of some supply stringencies next year, based mainly on expectations of further growth in demand and belief that a considerable portion of mothballed capacity won't be reactivated unless prices are high enough to compensate for present and projected high energy costs.

Aluminum scrap prices have moved up sharply in recent months, possibly making some idled primary facilities more attractive alternatives. Scrap aluminum exports are running about 20 pct ahead of the 1982 pace.

Incoming orders for ingot and mill products were running nearly 27 pct ahead of the 1982 pace through the first seven months of the year and industry sources said there was no slackening during the final weeks of summer. Orders for can stock were up about 5 pct, but orders for other sheet and plate items were up a thumping 60 pct. Part of the explanation may be that the Aluminum Association, which reports the incoming order figures, has been including orders for imported can stock in the "sheet and plate, other" category since the start of the second quarter.

Copper prices scored something of a first during the midsummer by slipping below aluminum ingot tags. Copper shipments and demand have improved from a 1982 level, but the consumption rate isn't expected to show real improvement until the capital goods sector revives. Meanwhile, sizable hedge market warehouse inventories bedeviled copper prices right up to Labor Day. Market sources see a fairly rapid pickup in the final quarter, assuming the economic recovery doesn't shift into reverse temporarily, along with the interest rate trend.

A surge in zinc prices during August reflected a combination of tight surplus and an improvement in both demand and consumption, in that order.

The supply situation isn't likely to correct itself soon, because users are trying to put a little extra metal aside. That means further price hikes are in the cards.

Shrinking U.S. zinc capacity has increased dependence on overseas sources. Retrenchment in the European zinc industry and a tightening in availability of zinc concentrates have served to bid up the market.

Lead prices worldwide this year have fallen to levels that could force some shakeouts among producers with less staying power.

About the only item that could be riding to lead's rescue in the short term is a robust storage battery market. The battery makers have been laying in stocks for the upcoming winter season, but it's too early to begin gaging how severe the weather will be.

The export market has been quiet this year, largely because of the absence of the Soviet Union.

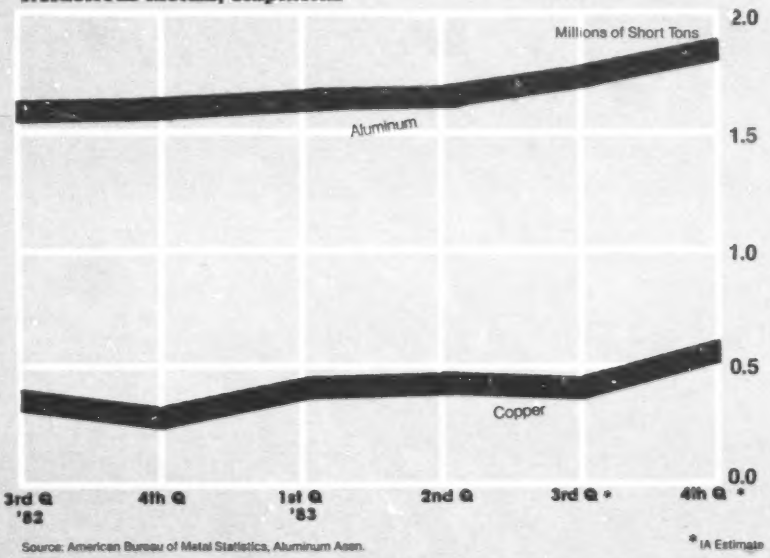
Lead exports had been a sustaining factor for lead prices over a year ago, with Russian buying on Western European markets soaking up a lot of freely available supplies. Although there were reports that Russian lead mines were "maturing" and unable to keep up with domestic requirements, Soviet import requirements appear to have dried up for the time being.

Free market nickel prices began edging up a bit as summer began winding down, but the capital goods markets still were not showing any signs of revival.

Producers' stocks are well below 1982 levels and there is little inclination to break the tight discipline that has been evident in output schedules.

Nonferrous metals industry officials attending the American Mining Congress annual convention in San Francisco in mid-September said they saw only slight improvement for the domestic mining industry in the fourth quarter. Chief obstacles for the copper, lead and zinc producers, they said, were foreign competition, large inventories, a strong dollar and relatively high interest rates.

Nonferrous Metals, Shipments



Source: American Bureau of Metal Statistics, Aluminum Assn.

*IA Estimate

QUARTERLY FORECAST

Auto

Americans probably will buy 1.2 million more passenger cars in 1983 than they did in 1982—6.9 million domestic-made cars, compared with 5.7 million in 1982. Constrained by restraints, imported car sales in 1983 are expected to equal the total sold in 1982: 2.3 million.

U.S. automakers likely will produce 1.9 million passenger cars in the fourth quarter of 1983, after producing 1.6 million in the third quarter. They likely will sell 1.8 million cars in the fourth quarter, after selling 1.7 million in the third quarter.

Auto dealers enter the fourth quarter with about a 55-day supply of cars; 60 to 65 days of inventory is average.

This year the dealers have had shortages of the popular models.

"We are now in the seventh quarter," says the sales analyst of one Big 3 automaker, "of what began as a very weak and grudging pattern of improving domestic sales. Now it's developing into a moderate upturn."

Sales of both domestic and imported cars likely will total 9.2 million in 1983. When total sales exceed 10 million and move toward the 11 million sales of 1979, automakers will be able to say that the recovery has arrived.

Most analysts and executives are predicting more than 10 million total cars sales in 1984.

Car sales climbed each month in the second quarter of this year to a peak 7.5 million seasonally adjusted annual rate (SAAR) in July. That rate is the auto industry's highest monthly total figure since the 8.1 million rate of August 1981, and the 8.6 million rate of January 1980. Sales in both those months, however were inflated by consumer incentive programs.

After fat price hikes each year in the late 1970s, automakers have raised prices in the past three years by much more modest increments. This year they'll raise prices by about 2.5 pct initially and by about 4 pct throughout the 1984 model year.

Consumers have flocked to the more expensive models. They paid 7 pct more for the average 1983 model than for the average 1982 model. Automakers raised the prices of 1983 models over 1982 by 3 pct.

The rise in car sales has been driven by a host of favorable factors: "Lower interest rates, lower unemployment, higher disposable income, an improving economy, much-improved consumer confidence, new cars, and stable gas prices all have increased car sales," says the analyst for one automaker. "I don't see anything on the near horizon threatening the upturn."

Consumer optimism now is at record levels, say forecasters at the University of Michigan. "The personal financial situation of American families," says the survey director, "improved substantially during the past several months due to more favorable income and price trends."

Machine Tools

"You might say we sense it, but we don't see it yet," says one machine tool maker about the recovery.

"We sense it with an increase in orders for perishables. We sense it because we inevitably follow a rebound in our major customers' markets."

Seeing is believing in machine tools and what they aren't seeing yet is a significant increase in domestic business. The numbers are up, but not dramatically and few makers expect any real surge in capital goods until 1984. "We always lag," says one.

Meanwhile, the industry is continuing its lobbying in Washington to stem, at least temporarily, the tide of machine tool imports from Japan and other countries.

Perhaps surprisingly, some machine makers have changed their minds about their chances with the Reagan Administration. They feel that the Administration's sentiments and perceptions of basic industries have been altered in recent weeks.

While the rest of this year may not register big increases in sales of tooling, many in the industry expect next year to be a good year, perhaps a terrific year. That assumes some very large changes in the foreign product situation, they caution.

In a "normal" situation, 1984 would be a banner year, with interest rates relatively low, inflation low, and a high-tech product line offering productivity gains too good to pass up. Unfortunately all of the above is offered at bargain basement prices by offshore competitors. Some lines in the market are already nearly 50 pct foreign and industry sources say they see no reason to believe that the number will stop them.

So, while all the signs say "we sense" the beginning of the real increases in domestic demand for machine tools, what is not seen is whether a number of American tool companies can survive the 1980s without a significant change in the country's policies about foreign economies.

The larger companies are confident of their ability to survive the "Japanese overhang," for example. The larger firms are also capable of capturing a good and healthy share of the flexible machining systems market, here and abroad. And, if automotive opts for FMS technology in a big way, that market will be huge. But, many of the smaller firms are worried. They neither sense nor see a great 1984 unless Washington first senses and sees the need for change in terms of foreign competition.

So, domestic orders will be moving up as 1983 ends. Next year's domestic orders for machine tools could be up dramatically from 1983. The question is whose order books?

QUARTERLY FORECAST

Instruments

The instrument and control industry will remain flat through 1983.

"Shipments will be 1 or 2 pct above last year and that is it," says an industry analyst. "Growth depends to a large extent on plant and equipment expenditures and companies are not spending that money yet."

Despite the economic rebound, there is little evidence that manufacturers have pulled themselves out of the recession enough to begin thinking about buying new equipment. Earliest estimates for industry recovery mention the first quarter of 1984. And if interest rates continue to rise, any pick up in the sales of controls and instruments would be delayed.

"The best you could say about the fourth quarter," reports an industry executive "is that it appears that business has stopped declining."

The manufacturers of some types of equipment are in worse shape than others. "Industrial controls and process control makers still remain in dire straits and business could get worse before it gets better," says an industry spokesman.

Control builders for industries such as oil refining may be looking out several years into the future before business picks up significantly.

The export picture does not look much better than the domestic scene. "The picture looks as bad as ever," says one industry analyst "Exports are down at least 5 pct this year and have been dropping faster in recent weeks." The lack of export sales is critical to the industry, because close to 30 pct of the instrument and controls market is overseas. Imports, on the other hand, are running about 3 pct or 4 pct above last year's totals.

Unlike most U.S. exports, a large quantities of controls go to Third World countries—the major oil producing nations, for example. Europe and Japan might be coming out of a recession, but the developing nations remain mired in it. Western Europe buys only about 20 pct of the instrument and control exports from the U.S., while Japan takes some 15 pct. The remaining markets are scattered throughout the world.

While controls for basic industries like oil, steel and power generation are selling poorly, controls and instruments that go to electronics-related industries are in heavy demand. "Semiconductor test equipment and related products are doing very well," says one industry member. "Environmental controls are not doing so badly either, the expanding housing market has boosted sales of products like thermostats and appliance controls.".

As the economy picks up, that part of the industry which serves the appliance, household and automotive markets is experiencing a recovery.

Computers

In 1982 the computer industry grew 13 pct. In 1983 that growth rate has intensified. By year end, industry sales should be up 18-20 pct above last year's totals.

Third quarter shipments may reach $9 billion, up from a second quarter total of $8.4 billion. The fourth quarter will be even stronger as computer sales, following the lead of the rest of the economy, pick up momentum.

The increasing growth rate is due to the continuing strength of some areas of the industry and a rebound of other markets that slipped during the recession. Mainframe and minicomputers, which took a drubbing during the downturn, are picking up steam again.

Personal computers for offices continue their rapid growth. Yet despite a favorable business climate, a number of personal computer manufacturers are finding it difficult to remain in business. Osborne Computer Corp., which recently filed for bankruptcy, is but the tip of the iceberg. A number of other companies are struggling. The shakeout that hit the home computer market several months ago is beginning to be felt by those personal computer manufacturers who sell primarily to business. Companies are in trouble, not because total business has fallen off, but because competition has increased, especially from IBM. Not counting the low-end home computers, personal computer sales are expected to grow nearly 60 pct this year.

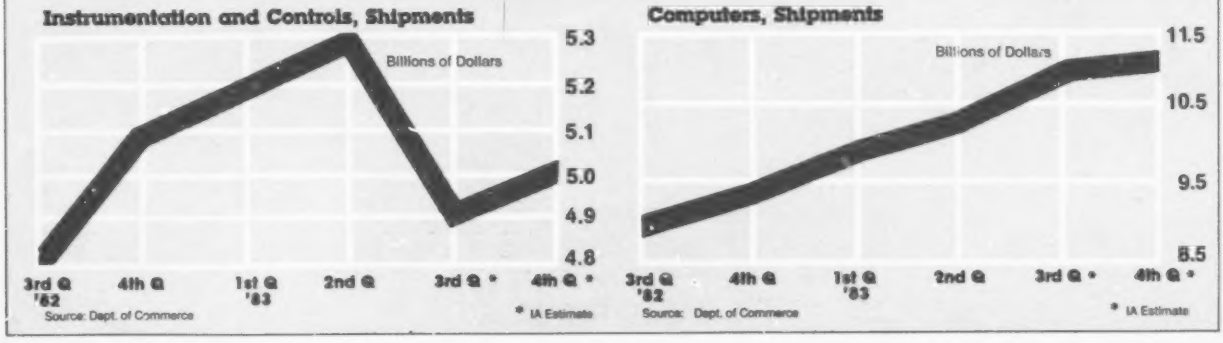
Imports of computers, computer parts and peripherals, especially from Japan, are becoming an increasing concern. Going into the third quarter, imports had topped $1.86 billion dollars, a 84 pct increase over 1982 totals. Japan accounts for about 40 pct of the total value of U.S. imports.

U.S. exports of computers are expected to increase by 20 pct through 1983 as major foreign markets continue their slow recovery. Several firms have reported increasing overseas business in the third quarter and feel the fourth quarter will remain strong.

As the U.S. economy picks up, the computer industry, which overall was never really down, is beginning to approach pre-recession growth rates. "Business looks better and better through the last months of 1983," says one industry member, "but we are still continuing to recover from two years of recession. I think that business will continue to improve through the first half of 1984."

Industry growth is proceeding more rapidly through three quarters than was forecast. And the future looks bright as the run by businessmen on personal computers should continue. Industry is beginning to look to the computer as a major tool for improving productivity and streamlining operations.

The industry's biggest worry is the continuing growth of imports coming into this country.



QUARTERLY FORECAST

Metal Coatings

Shipments of industrial coatings in all of 1983 are expected to increase by 7 pct over those in 1982.

Analysts estimate that 72 million gallons of coatings will be shipped in the third quarter of 1983 and 70 million gallons in the fourth quarter. That's an 8 pct increase over shipments during the second half of 1982.

The two biggest reasons for the upturn in industrial coatings are the auto and appliance industries.

Domestic automakers likely will build 20 pct more cars this year than last. They continue to use increasing amounts of zinc-rich weldable primers such as Zincrometal. Even during the depression in car sales from 1980 to 1982, automakers continued to order more zinc-rich primers and covered more of the car with it.

The 1½-side galvanized steels used by Chrysler sometimes compete with Zincrometal and someday could squeeze out some of its market share. Today, however, shipments of both Zincrometal and 1½-side galvanized steels are increasing.

The appliance industry looks promising especially for coil coaters. General Electric and Whirlpool appear on the verge of a major increase in precoated metals. Other appliance makers likely will follow.

In other major markets for coatings, builders of preengineered structures continue to increase production. Two threats to industrial coatings in this market are bare and galvanized steels; and a law in California that would ban metal-frame residences there. On the bright side, Bethlehem Steel is beginning to precoat Galvalume.

The container industry hasn't been hurt by the recession. In the big battle over how to build beverage containers, precoated steels stand a good chance to be the material of choice for draw and redraw containers.

Plastics

As tough as things have been on the American economy, there is one industry that is flying high—plastics.

Last January, many laughed when G.R. Munger, president of The Society of the Plastics Industry, Inc., predicted a 14 pct increase in the effective use of plastics in 1983.

Well, the way things are shaping up, Mr. Munger might have been too conservative in his estimate. Through the second quarter, 1983 was 13.5 pct ahead of 1982. But business really picked up in June, which was 27 pct ahead of the same period a year ago. From all appearances, the sales and captive use of thermoplastic and thermosetting resins in 1983 will surpass Mr. Munger's prediction.

The second quarter was healthier than the first quarter. The third quarter shows every sign of being an improvement over the second quarter, and the fourth quarter should be the best of all.

So far this year, the big six among the plastics constitute 82 pct of the business. The big six include low-density polyethylene, polyvinyl chloride, high-density polyethylene, polypropylene, polystyrene and the phenolics. Phenolic and other tar acid resins, the only thermoset among the six leading compositions, are showing a huge gain of 22 pct over 1982.

As a whole, thermosetting resins have moved up by 18.7 pct in sales and captive use over 1982. The gain in thermoplastic resins has been 12.8 pct. So far this year, the thermosets have increased their share of the total plastics market from 12.5 to 14 pct.

One explanation given for this good year in plastics is that inventories have been used up and many industries requiring plastics have begun to move full steam ahead. Epoxy resins, a category familiar to metalworking, is showing a 3.3 pct drop, however, in sales and captive use.

Fluid Power

Despite a surprisingly strong order surge in July, as reported by the National Fluid Power Association, (NFPA) fluid power shipments for the last three months of 1983 aren't expected to show much gain over the third quarter level.

Shipments to the mobile power users of hydraulics are still slow, though truck OEM shipments began to advance in the third quarter and are continuing a good performance as the fourth quarter begins.

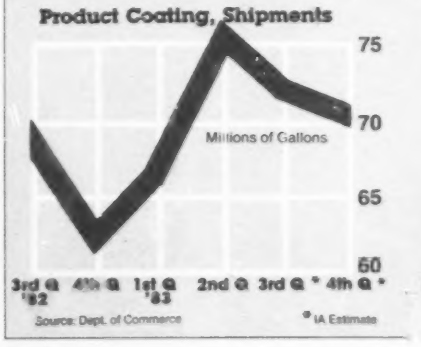
Machine tool and other industrial markets are also continuing slow. Based on orders of small lot sizes and fast deliveries, users of fluid power systems are holding inventories at low levels.

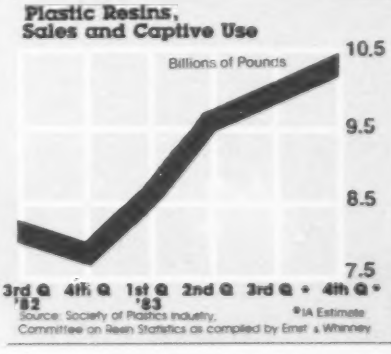
The level of business in the third and fourth quarters looks to be running well over the year ago periods. It is now expected that the shipments of all fluid power items will surpass last year's third and fourth quarters by about 20 pct in each quarter.

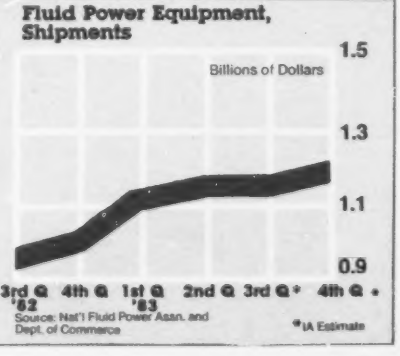
In hydraulics, historically it takes six to nine months for an order surge to be reflected in shipments. In pneumatics, this lag time is considerably shorter. An order surge can increase shipping volume in pneumatics in as little as 30 days.

As a result, a 60 pct gain in new hydraulic orders in July this year, over July 1982 won't be reflected in shipments until the November-December period. Pneumatics, which has been showing a little more stable course in its new orders, rose only 6 pct in July. This should begin to be reflected in rising shipping rates during October.

Fluid power builders are still cautious, but seem to be willing at this stage to agree that 1984 will see another gain over 1983, and that 1983 shipments should show a slight percentage gain over 1982, though only by a few percentage points. All of that gain will come in the second half of 1983.







QUARTERLY FORECAST

Construction

Despite moderate second quarter gains, the construction equipment industry is still weak.

The second calendar quarter is usually the best period of the year for the industry. Traditionally, in the third and the fourth quarter, industry sales drop.

Domestic sales in the second quarter rose 11 pct, but that still left the industry at almost 30 pct under the 1982 sales total.

What has caused more concern in the construction industry ranks was the August comment from Caterpillar Tractor, the industry's largest producer, that it was adjusting its forecast for 1983 downward.

The Caterpillar announcement also included word of some layoffs for September, but other recalls the company plans would give a slight employment gain of about 250 workers.

Export sales of construction equipment amount to about half of total annual sales for many major U.S. builders. So a 50 pct drop in the 1983 first half, after a continuous slide in export sales through 1932, hit the industry hard.

Though some big ticket items like cranes are still heavy in finished goods inventories, stocks of earth moving equipment have finally been reduced to levels described variously as "manageable" to "thin." This could prompt a revival in the industry, perhaps in the current quarter.

To some extent this has already occurred, but it has not been widespread enough to help the entire industry. In some industry segments, like paving machinery, a rebound is in evidence.

With a forecast for next year of moderate gains and dealer inventories looking better, vendors should see some new buying in construction machinery over the next two months, despite any seasonal retail sales decline at the end of the year.

Farm

Despite a summer that was straight out of *The Grapes of Wrath*, farmers will probably take more farm equipment off distributor shelves in the fourth quarter. A mild farm machinery recovery began to be noticed in the first quarter and has continued.

That's a gain, but from a very bad 1982, so the industry still has a long way to go to a recovery. Deere & Co., the biggest U.S. farm machine builder, reported in late August that it was showing a net nine month loss of $34.7 million, despite cutting trade receivables by $157 million and inventory by $231 million in the most recent fiscal quarter.

Despite these plusses, Deere officials warned that there is still a lot of some lines of farm equipment out in inventories.

That takes some of the gloss off the apparent 50 pct retail surge in sales of farm tractors in the second quarter over the low first quarter level. That gain may also look better than it is. For the first time, the Farm & Industrial Equipment Institute began to include small garden type tractor in its statistics in 1983.

In the fourth quarter, sales should rise about 15 pct over the third quarter low.

Low prices were, and continue to be, a depressing factor in the farm equipment picture. Pricing has been soft all through both 1982 and 1983, and there doesn't seem to be much change expected in the fourth quarter.

In May of this year farm equipment builders were polled by the (FIEI) and the results indicated that sales would decline by several percentage points this year. By July, total tractor sales for the year-to-date were only 3.8 pct behind 1982. In the fourth quarter, sales rise seasonally over third quarter. It can be expected that both sales and manufacturing rates will begin to look better in the next two months.

Mining Equipment

The ore boats are moving again on the Great Lakes and an unusually hot summer has kept coal mines busier than usual.

Yet no one in the industry is all smiles. Instead, they hope that one of the worst periods in its history is ending.

Iron mines haven't been as quiet since the Great Depression and it will take a sustained recovery to move this industry towards significant capital investment, says one industry executive. "You may not see another large iron ore project in the U.S. range area for a decade," he adds.

Capacity in northern Michigan and Minnesota was built to handle steel production years of 130 million tons and more. Such years in the U.S. may be gone.

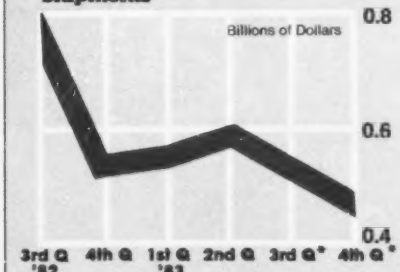
So difficult are the times in iron mining that the unthinkable has occurred in pricing. Some special grades have actually been lowered.

Iron ore price drops are indeed a sign of the times, but not a sign of any increase in industry spending. The special boats, special equipment at the mines and special unloading systems are all in place. The best that iron mining equipment manufacturers can hope for is a slowly recovering customer in need of maintenanace. Even a steel boom would have to last years before any major trend towards further orebody exploitation.

Coal miners, on the other hand, are busy customers for equipment makers. Simply put, coal mining is more essential than ever and analysts expect the industry's tonnage to grow over the next several years at a 10 pct annual rate.

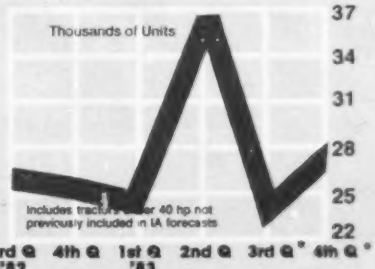
Equipment companies are reporting healthier business from coal interests in over two years and they expect it to continue. "Coal doesn't sound high tech, but without it there isn't any tech," says one analyst.

Construction Equipment, Shipments



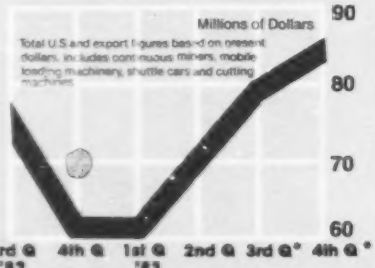
Source: Dept. of Commerce *IA Estimate

Wheeled Tractors, Retail Sales



Source: Farm and Industrial Equipment Institute *IA Estimate

Mining Equipment, Sales



Source: Mining Equipment Mfgrs. *IA Estimate

QUARTERLY FORECAST

Material Handling

"Yes we're seeing it. The recovery is becoming quite real to us," says a leading material handling equipment manufacturer. "Our inquiries are way up, particularly for smaller ticket items like trucks and accessories. That seems to say to us that people are getting busy out there and people are preparing for increased business."

Overall, the industry expects the last half of 1983 to be way above the last half of 1982 by perhaps as much as 20 pct in adjusted figures. And, they happily note, their industry, except for lift trucks, does not suffer from import pressure.

"So much of our industry is custom, almost entirely so in the big-ticket systems end, that we doubt if it will ever have the same import problems as steel or machine tools," says one company president.

Several industry members report a sharp increase in recent weeks in questions about state-of-the-art systems from automotive and aerospace companies. Some expect a traditional increase in capital goods inquiries to follow by the end of 1983.

"We are confident that this country's basic industries are only concerned with appropriate timing and that means perceptions about interest rates long term. When corporate America is convinced of a permanent return to normalcy in that area, coupled with low inflation, our industry's problem will be capacity," says one large firm's chief marketing representative.

The third quarter is already shaping up better by far than the second. Fourth quarter results could be spectacular. And 1984 could very well be a boom year for the industry.

"The market seems to know, in general terms, that we've got a significant product to offer. They only have to believe that the time is right to buy," says one sales executive.

Appliances

With the economy on the upswing, many metalworking industries see good times ahead. The appliance industry is the exception.

The industry has experienced strong sales through the first three quarters of 1983, but is now concerned that some dark clouds may be on the horizon for 1984.

Despite some uncertainties, the industry should stay strong through the fourth quarter of 1983. Fourth quarter shipments will be down slightly from the third quarter figures only because sales normally dip at year end.

The major worry is that rising interest rates will dampen housing starts and sales. New home buyers usually account for about 20 pct of appliance sales.

Following a 3 pct decline in June, July saw home construction down 6 pct. Government officials at that time warned that the housing revival could continue to weaken.

However, in August new housing starts jumped by 8.4 pct, the highest level in more than four years. While the higher mortgages seem not to be affecting housing starts at present, August witnessed a 6 pct drop in building permits, which could signal some disinterest by the builders.

Despite recent increases in mortgage rates and any slump in housing permits or starts in the fourth quarter, appliances should sell strongly through 1983.

If the growth of appliance sales to home owners is expected to ease next year, retail sales are expected to remain strong. A pent up demand for replacement appliances shows little sign of abating. Retail sales this year have been greater than last year.

The number of appliances sold during the first half of 1983 was up 8 pct from 1982. Sales for all of 1983 compared to 1982 should show an increase of 12 pct.

Oil Country

The pace of oil drilling activity has been slowly increasing, lending an air of cautious optimism to the producers of oil country tubular goods (OCTG).

But the ascent is expected to be gradual, and there is little indication that OCTG producers are anticipating any strong recovery this year that would return shipments to the levels of two years ago, before the current dramatic downturn began.

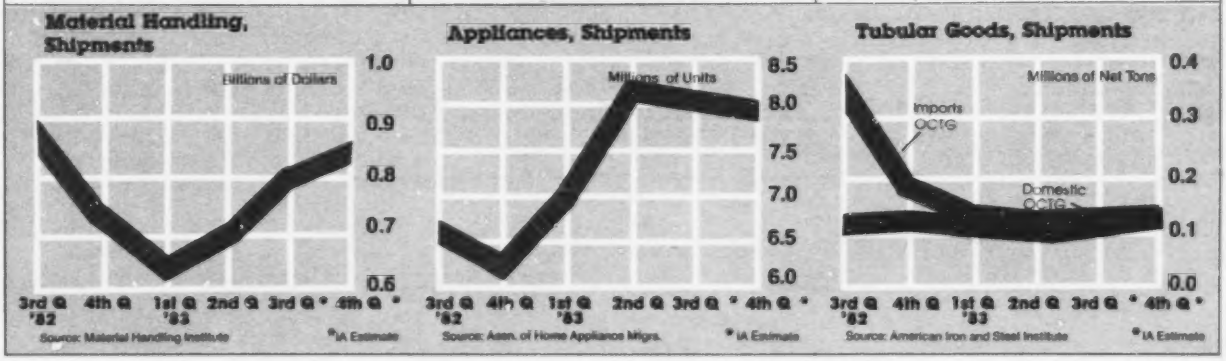
Rig activity has been on a steady increase since bottoming out in mid-April. By mid-September, there were 2,247 rigs operating, up some 24 pct from the 1,807 low point in April, but still below last year's comparable rig count of 2,499.

The rebound in the national economy and a firming in energy prices are cited as key factors in the noted upsurge. Uncertainty surrounding the latest price points established by OPEC appears to have been removed after a delay of several weeks while industry officials waited to see if the new price levels would hold.

Another contributing factor, in the view of industry analysts, is that several large oil companies underspent their drilling budgets during the first half of the year and now are compensating in the second half. Drilling expenditures have risen about 12 pct.

But the focus remains on oil rather than deep gas. Costly offshore drilling, which requires new expenditures, will, in the industry's view, recover slowly. Officials don't foresee any dramatic upturn until at least 1985.

And for OCTG officials, extreme caution remains the rule, because there is as much as a two-year supply of tubular goods and other oilfield hardware on hand. There has been a surplus of inventory at almost every level. Some officials don't believe the needed recovery will come until the rig utilization rate reaches 70 pct, a significant rise from the current pace.



QUARTERLY FORECAST

Castings

Ferrous castings should show some seasonal dip in the fourth quarter. Historically, industry shipments in the third quarter drop about 7.5 pct below the second quarter level.

But this year, that isn't what's happening. Though plagued by high scrap prices, short backlogs and critically short delivery times from their customers, a wide segment of foundries have been getting some unseasonal gains in orders—even during the summer months.

Although the gains were minimal and masked by the relatively low order lots from customers, the incoming order frequency rate began to advance in areas of truck, appliance, and farm and construction machinery.

That hasn't cured the very competitive price problem in castings. However, heavy castings buyers are beginning to stir a little and get ready for heavier buying in the fourth quarter. Since the consumer markets for castings (auto and appliance) tend to drop off at that time, the gains from industrial market buyers aren't going to be enough to push total castings shipments up to the level of the second quarter.

But it does mean that a segment of the foundry industry that has been running at 40 pct and 50 pct of capacity in recent months is beginning to get out of the basement.

It also means that castings shipments in the ferrous grades are going to squeeze past their low 1982 total performance when the final figures are totaled up for 1983.

This isn't yet evident in the order backlog, mainly because of the very short delivery times customers insist on getting.

But there have been very mild backlog gains over the third quarter. It now appears that these gains will continue, at least in the heavier castings, through the fourth quarter.

Forgings

After a long drought, the forging industry is beginning its turnaround.

A pickup in orders has finally come, although the gains so far have been confined to impression die forgings and some ring-rolled forgings. Open die producers remain in bad shape.

In April, impression die forging orders were about the same as those received in the same period a year earlier. Since April, however, monthly orders have been well above their 1982 counterparts. For example: In July, traditionally a slow month for the industry, orders reached $132.3 million compared to $87 million in July 1982.

Though the industry has begun to bounce back, it still has a long way to go to regain its health.

The industry's 1982 sales fell 45 pct below 1981 figures and so far this year orders are running only about 12 pct above 1982 totals.

Since 40 pct of forging sales go to aerospace industries, recent order increases from that market have provided some reasons for optimism. While commercial aircraft manufacturers are not building many planes, increased parts orders are coming in from military aircraft manufacturers.

The automotive industry is also demanding more forgings, although that industry accounts for only a small percentage (5 pct) of the total market for impression die forgings.

Other industries, such as farm and construction equipment and oil field goods, remain depressed, however.

Even firms that are seeing new orders this quarter, don't see a great deal more this year.

"We see ourselves on a plateau for the rest of the year, but at least that plateau is a little higher than earlier this year," explains one executive.

Many industry members are optimistic about 1984, but anticipate that growth throughout the year will be gradual.

Heat Treating

The range of reports on business conditions from heat treaters still varies and really depends on who you talk to.

One of the remarkably strong areas is automotive. While the general heat treating industry has been below the year ago period in the first half, some producers with a strong consumer auto customer list, have been beating their 1982 performance all the way through the first half of 1983. They argue, and with good cause, that they will continue to run at this strong rate right through the remainder of 1983 and into next year.

On the basis of past history, the industry traditionally has its strongest gains in the first half, and then, slumps about 10 pct (below the second quarter) during the third quarter. Some heat treaters went through the summer months at second quarter levels. One company was running substantially over the third quarter of this year—even though it improved upon its performance in both the second and third quarters of 1982.

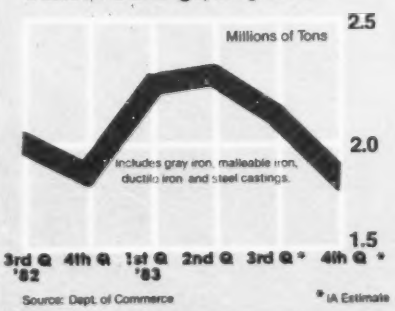
Even more surprising, some heat treaters who market heavily in the capital goods markets have done well. One industry member admitted a 20 pct improvement over last year's third quarter.

He believes that margin can be improved to 30 pct over year ago levels in the fourth quarter.

Traditionally, the industry posts its best gains in the first and second quarters of the year. The data suggests that the second quarter automotive surge improved on what would have been just an average period.

This surge should also improve on the prospects for a good second half, despite complaints by many heat treaters that cash is still tight. A more normal surge in the fourth quarter heat treating business will help confirm expected gains for the industry again next year.

Ferrous Castings, Shipments



Source: Dept. of Commerce * IA Estimate

Closed Impression Die Forgings, Shipments

Source: Forging Industry Assn. * IA Estimate

Heat Treatment

Source: Industrial Heating Equipment Assn. and Metal Treating Institute * IA Estimate

QUARTERLY FORECAST

Aircraft

The outlook for aircraft manufacturers is brightening.

Although shipments are showing an improvement over last year's severely depressed levels, there is still little indication of an across-the-board, sustained recovery.

There is subdued optimism, based on reports from major airline carriers, the customer base for the manufacturers. Air traffic has been building at the major domestic carriers this year and the second quarter figures were strong enough to restore a positive earnings picture for most domestic carriers for the first time in a year.

If this trend continues for the duration of the crucial third quarter and into the fourth, the airlines could be ready within six to nine months to begin placing the orders for the new aircraft that the manufacturers confidently are waiting to sell.

Meanwhile, the aircraft manufacturing sector continues to be burdened with fierce competition, novel leasing arrangements and a glut of used aircraft, all of which depress new sales.

One leading American aircraft executive echoes a common sentiment when he notes that although airline traffic growth and recent profiles have shown some improvement, the world's airlines still are faced with a cost/revenue squeeze and considerable excess capacity in certain models of aircraft.

As a result, new order activity continues to be low for all manufacturers, some deliveries are being deferred and, in certain cases, manufacturers are being required to make substantial financing commitments to sell the new planes.

However, although the short-term market remains uncertain, optimism prevails about the long-term outlook. Major manufacturers are positioned to respond to the expected resurgence of demand with new technology and more fuel efficient aircraft.

Engines & Turbines

The engines and turbines industry continues to lag in the second half, with certain segments of the wide-ranging category showing some improvement and others noticing little increase in demand.

Any upswings noted have been minimal. So while the signs are more hopeful over the long-term, the short-term outlook remains guarded.

The consensus leans toward a relatively flat demand curve through the remainder of the year. No strong upsurge is anticipated until at least midway through 1984.

One major problem affecting the industry is the caution surrounding interest rates and the strength of the national economic recovery. The building industry is showing only a half-hearted recovery, and as a result, construction equipment producers suffer from an inventory excess and continued uncertainty.

The lingering recession in the commercial aircraft market also is taking its toll in the engine sector. Few industry executives forsee a recovery until the middle of 1984.

The power generation market continues in a weakened state, so the outlook for power generation sets remains flat. One official says the recovery in this segment is lagging about 18 months behind that of the general economy.

The utilities market slump is dragging down that segment of the engine and turbine industry. With no new major projects in the nuclear field planned, the outlook for equipment suppliers is dim.

One hopeful sign is a firming up of crude oil prices, which is having a positive impact on the refinery business. On the whole, most industry observers look for slight increases through the end of the year with no strong movement toward recovery until the middle of 1984 at the earliest.

Welding

The welding industry experienced a sudden, unexpected upsurge in business during the second quarter, but, looking back, the spurt has to be regarded as a false alarm.

Business for the welding industry has returned to the course it has been following since the second quarter of 1982: Just plain flat.

According to the statistics compiled by the National Welding Supply Association (NWSA), Philadelphia, June was the best month for welding distributors since November 1981, and 1981 was the best year in the welding industry's history.

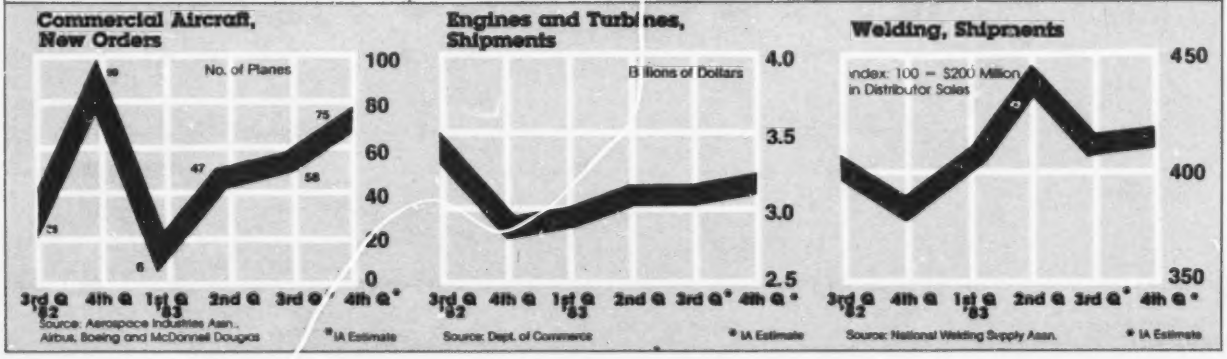
This year's third quarter resembled the first quarter, and the fourth quarter will probably be about the same. If there is anything good to look forward to, it could be the first quarter of 1984. That could be the time when industry will have no other choice than to replenish inventories.

Several distributors throughout the country have given their views on the present state of the welding economy. One remarked: "Last year we were in the absolute pits at this time. Welding lags the rest of the country by six months; therefore, we are hoping for a strong 1984."

Major deterrents to recovery in the Midwest, a big market area for welding, include lackluster activity in machine-related businesses, automobile supply parts, and heavy equipment, both agricultural and off-road types.

"This is not an area where industries are taking off and we don't expect much for the rest of the year," observes a welding distributor from the Midwest.

"We see sporadic signs of recovery," comments a distributor from the Northeast. "We experienced a boost in May and June, but things fell apart in July. We are not seeing fewer customers, but we are seeing fewer orders."



QUARTERLY FORECAST

Fasteners

Mechanical fastener manufacturers are reporting some surprisingly good business signs as the industry heads into the fourth quarter.

"We're seeing increases across the board," says one large fastener manufacturer. "It's really surprising."

Imports, however, continue to plague this industry. There seems to be no real hope of any relief, says one industrial analyst, unless some "totally new industrial policy develops in the U.S."

Still, it has been nearly two years since any good news arrived for the fastener manufacturers and expectations are that dollar volume will be up by as much as 15 pct in the third quarter compared to 1982 and as much as 20 pct in the fourth quarter. "That's up from a bottom, of course," says the industry analyst.

If 1984 is "surprisingly better" than the markedly improved last half of 1983, fastener makers believe there may be a future for what remains of the standards part of the domestic industry. This assumes reductions in imports as well as increases in sales here due to a worldwide recovery and strained overall capacity.

"The terrific increases in automotive has helped us a lot," says one manufacturer. "From what we hear, that trend will continue. I guess people have decided to buy new cars again."

Some producers also expect a traditional follow through, with the rest of the economy picking up steam as the year ends. "We expect exactly that," says the manufacturer. "We see a very, very good last quarter for parts of this industry."

The "parts" he is referring to are so-called specials or engineered fasteners. Standard nut, bolt and screw companies can only report a continuing erosion of the market to the Pacific Basin economies.

Screw Machine Products

Although the worse is over, screw machine product manufacturers remain cautiously optimistic about continuing industry growth.

Through three-quarters of 1983, the industry has seen a modest, but spotty upturn from 1982. A number of manufacturers see further recovery as a slow, uneven process.

Sales are beginning to pickup as the economy thaws. Through July year-to-date orders are running about 26 pct ahead of last year. U.S. Commerce Department officials believe industry shipments for the year will be a bit above 1982 totals. Industry experts see order gains for the year holding up through the fourth quarter and building steadily in 1984.

The best thing to happen to the industry has been the pickup of automotive sales, since about one-third of all screw machine products go into cars and automotive-related equipment.

"Our automotive business picked up in April and has seen some growth since then, although business still could be better," says one manufacturer. "I see 1984 being a better year than 1983, but growth is going to be slow."

Another bright spot has been the strong showing throughout 1983 of the appliance industry. Sales to electronics firms and computer manufacturers have risen as have orders from firms making equipment for the military.

Those markets that remain depressed include the aircraft, general machinery, oil field products and off-highway equipment manufacturers.

This industry is tied to the general economy. The faster this country pulls itself out the the recession, the better the screw machine products industry will fare. But the industry will not experience strong sustained growth as long as a number of sectors remain depressed.

Stampings

With the acceleration in auto sales, continued improvement in consumer spending patterns, robust activity in the computer field and some recent large defense contracts, the stamping industry expects to finish the fourth quarter from 5 to 10 pct ahead of that period in 1982.

But make no mistake about it, says one executive,"we're talking cautious optimism, not jubilation."

The industry backlog in July stood at its highest point since May 1981. The strength of the backlog, reflected by the scheduling of future shipments, will probably "be good from here on out," says another stamping source.

Orders and shipments of contract metal stampings showed the usual seasonal slump in July, yet were 51 pct higher than July 1982 figures.

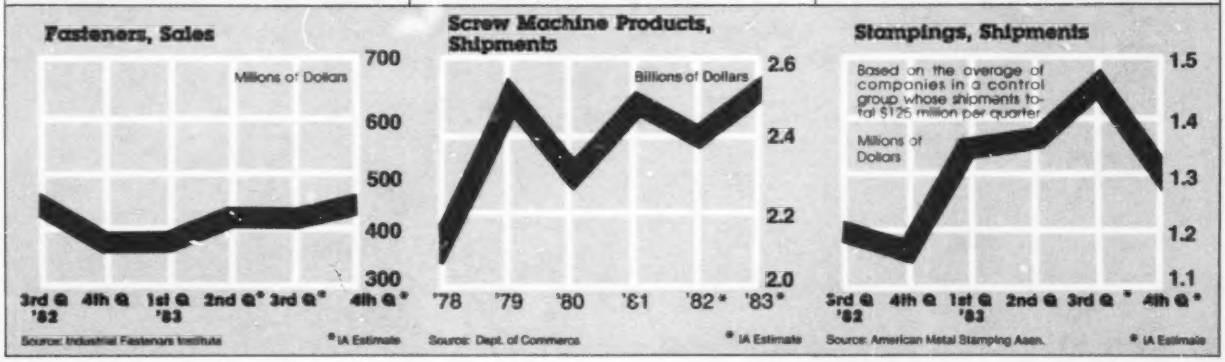
Stampers are elated about the rebound in domestic auto demand, since that market constitutes half of their total market. Imports don't heavily impact this industry, although as one stamping executive puts it, each finished car that comes into this country costs the industry 100 stampings.

The appliance market is holding up well for the stamping industry. According to one stamping industry executive, consumers are continuing to purchase refrigerators, washing machines, dryers and stoves. Of course, this summer's unrelenting heat wave really heated up sales of air conditioning equipment.

How do stampers see the economy in 1984?

Notes one executive: "It behooves the Reagan Administration to appear to be effecting a healthy, active economy. So I'm predicting that there will be a crimping of interest rates and inflation will resume somewhat as more money becomes available.

"I envision arbitrary controls going into place, too, as a short-term spur to the economy."



QUARTERLY FORECAST

Bearings

Despite the pickup in the general economy, the bearing industry is still struggling.

Figures for the first half of the year show business for the bearing industry down about 15 pct. And although bearing manufacturers see some turnaround by the end of the year, 1983 will stack up as a mediocre year.

That the recession continues to plague this industry is surprising. Some 30 pct of bearing sales go to the automotive industry, which is enjoying increased business.

The growth in orders from the automotive industry has not been able to offset the continuing depression of other major markets.

"A number of industries are still hurting," reports one industry spokesman. "Farm machinery is way off, construction machinery is still down and oil field goods took a significant dip this year. That industry is looking at about a 25 pct decline this year."

In addition, despite some pickup in military spending, the aircraft industry is doing worse than last year. Other bearings markets still in the doldrums include the metalworking machinery industry, railroad equipment and industrial machinery.

Too much dead weight is pulling down any gains the industry has made. Thus, despite an expected business pickup during the next several months, U.S. Commerce Department officials predict that bearing shipments by the end of the year will be down 7-8 pct from 1982.

The best that can be said is that current declines are not as bad as 1982. Shipments that year dropped almost 20 pct. The poor showing has made analysts hesitant to predict a strong 1984.

However, as the economy continues to heat up, manufacturers are optimistic that the bearing industry will eventually start rolling.

Valves

Overall, valve manufacturers seem to characterize their industry as "somewhat better" than it has been lately. Several believe a gradual recovery will take place in the last quarter.

But one industry spokesman says this is a time of turmoil for his business. He sees the continuing competition as either forcing some businesses to scale down or withdraw entirely.

"There's nothing like it since 1958," he concludes.

His lead times are running three to four weeks, compared with 10 to 12 weeks in the same period of 1982.

Operating rates in the industry are still down, notes another valve industry source, but are expected to rise slightly in the fourth quarter.

He rates present construction activity as 'so-so'.

The municipal market was on the upswing in the third quarter of this year, as a result of a decline in interest rates. One industry member says the market for water and sewage equipment turned around.

The energy market was described as "flat on its back" in the previous quarter. But now, says one valve official, there's been a resumption in drilling. Since some 50 to 60 pct of valves are used by the energy field, this is good news to the valve industry.

However, as one valve spokesman points out, the energy companies are in the buying seat and making the most of it—they are heavily into price negotiating and they don't carry inventories.

One industry source admits his shipments for the last quarter will trail those of 1982, but he is boosting inventories 10 to 15 pct to catch the demand for fast deliveries.

Despite the hard times, valve executives are looking at it philosophically. As one put it, "we may be better off in the long run for this, it will have forced us to be more efficient."

Gears

Although one gear executive sees the final quarter of 1984 closing on a "moderately optimistic" note, most believe that no improvement will be evident until the second, perhaps the third, quarter of 1984.

Meanwhile, there's lots of bidding going on, with everyone jumping for all available jobs. Lead times, says one executive, are ridiculously short.

"Everyone wants it yesterday," grumbled one gear maker.

The auto industry is a captive shop for the gear business, so gear executives couldn't be happier that domestic car sales are doing so well.

Defense and aerospace business has been soaring lately, but that accounts for a small segment of the industry's orders.

Gear industry executives differ in their perceptions of farm equipment purchases. Because of the prolonged drought and poor crop yield, says one executive, farmers can't be in an equipment-buying mood. Another calls this a bullish market, buoyed by the Soviet grain deal and PIK (Payment-In-Kind). Farmers have money and will be spending it for new machinery. He sees new orders from the farm equipment manufactuers coming in by October.

What is bothering gear manufacturers?

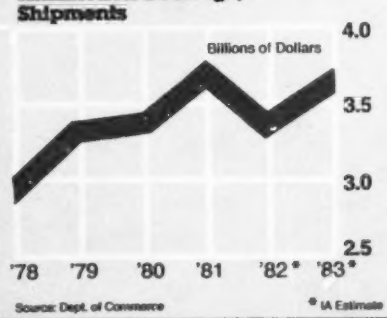
Most cite Federal deficit spending and higher interest rates, which depress their orders from capital goods producers.

The strong dollar continues to encourage gear imports, with exports running low. But until interest rates decline, gear makers don't see any reversal of this lopsided condition.

Even with little to write home about, gear manufacturers are expressing confidence in the future.

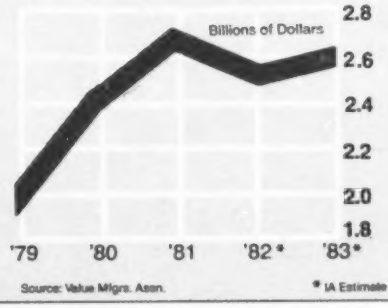
But, of their own last quarter, 1983, says one, "we're just bumping along the bottom."

Antifriction Bearings, Shipments



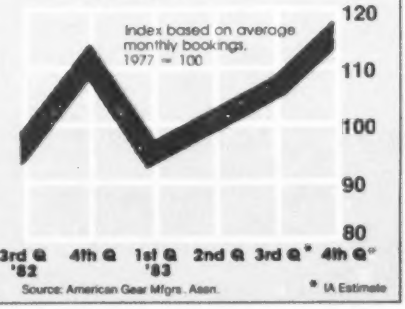
Source: Dept. of Commerce * IA Estimate

Valves, Shipments



Source: Valve Mfgrs. Assn. * IA Estimate

Gears, Bookings



Source: American Gear Mfgrs. Assn. * IA Estimate

QUARTERLY FORECAST

Shipbuilding

An oversupply of merchant vessels, few new orders and a nearly nonexistent order backlog continue to plague the shipbuilding industry.

According to one observer, foreign shipbuilders have captured a large share of the merchant vessel market with government-subsidized prices and modern facilities.

"Unless the battle against (the Reagan) Administration free trade advocates is won," he says, "and some favorable legislation is passed, domestic commercial shipbuilding capacity will continue to erode."

Commercial business is so bad that the only significant new construction is a coal barge for the Delaware Bay.

A battle is shaping up in Congress over the 1920 Jones Act, which has continuously required that only U.S.-flag, U.S.-built and U.S.-manned vessels may operate in domestic trade.

Appropriations for FY 1984's Navy Shipbuilding and Conversion program will probably run slightly over $12 billion. This expenditure calls for the construction of 16 ships. Leading the agenda are three Aegis cruisers, three attack submarines, one Trident submarine and an amphibious assault ship. Also to be constructed are a landing dock, two fleet oilers, three mine countermeasures ships, a guided-missile frigate and a mine hunter.

On the conversion side, work is planned for four fast logistics ships and one hospital ship.

Only four to five shipyards will participate in this construction work.

In FY 1983, the Navy appropriation was $20.6 billion. Included in that program, however, were two aircraft carriers. The year before, the expenditure was $12.8 billion.

What effect, if any, will the Korean Air Lines incident will have over Navy shipbuilding? It's too early to say for sure.

Rail Cars

As goes coal, so goes rail car construction, and coal has not been moving well lately. Truck trailers and grain are other major factors in determining the health of the railroads, but coal is the big one.

According to the Association of American Railroads (AAR) and the American Railway Car Institute, orders for new freight cars totaled 934 in July, up from 150 in June and 179 in July 1982. Orders through the first seven months of 1983 totaled 3,564, compared with 4,844 for the same period a year ago.

Deliveries in July totaled 289, compared with 338 in June and 1,381 in July of last year. The seven-month total was 2,593, compared with a whopping 13,769 during the same time frame in 1982.

The two railroad associations report that the backlog of cars on order but undelivered as of Aug. 1 was 3,968, compared with 4,659 on July 1 and 7,285 on Aug. 1, 1982. So far in 1983, the average monthly backlog is 4,310 cars, compared with 11,305 last year.

Meanwhile, the AAR reports that 11 new and rebuilt locomotives were placed in service in July, compared with 13 in June and 16 in July 1982.

Taking retirements into account, the fleet of owned and leased diesel locomotives on Aug. 1 totaled 26,249, compared with 26,290 on July 1, and 27,397 on Aug. 1, 1982.

According to the AAR, net revenue from operations for the U.S. freight railroad industry in the second quarter of 1983 totalled $349.4 million, 12.6 pct below the 1982 second quarter figure of $399.8 million. □

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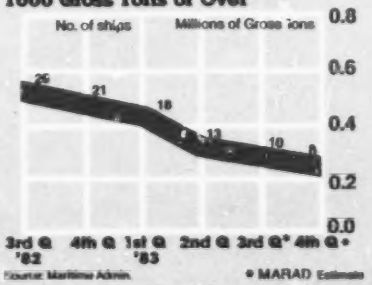
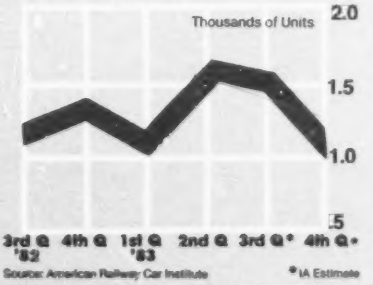
Shipbuilding, Commercial Ships on Order or Under Construction, 1000 Gross Tons or Over



Source: Maritime Admin. * MARAD Estimate

Rail Car, Orders



Source: American Railway Car Institute * IA Estimate

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STEEL TAKES AN ORGANIZED LOOK AT QUALITY

Steel is under heavy pressure to improve quality and lower costs and it believes it can do it through the use of process control.

BY GEORGE J. MCMANUS

"From my viewpoint, it's the biggest thing that's happened in my 20 years with the company," says Herman J. Henn, staff engineer, control engineeering in the research department of Jones & Laughlin Steel Corp.

Mr. Henn refers to a control network that centers on a new continuous caster at J&L's Indiana Harbor Works.

From another viewpoint, the control field is discussed by Robert E. Maroney, president, metallurgical products, Leeds & Northrup Co.

"As suppliers we're encouraged by the steel industry's new commitment to process control," says Mr. Maroney. "We're coming to the conclusion that this may be a bigger market than we thought."

Also bullish is IBM, which is re-entering the market for process computers in steel and all manufacturing. "We are targeting industrial automation as a major growth area," says Holland Brown, manager of IBM's industrial automation center in Houston.

In the steel industry, companies are under heavy pressure to improve quaiity and lower costs. The mills don't have the money to do this by building complete new blast furnaces and strip mills. Existing facilities must be upgraded and control systems provide the means of doing this without massive infusions of cash.

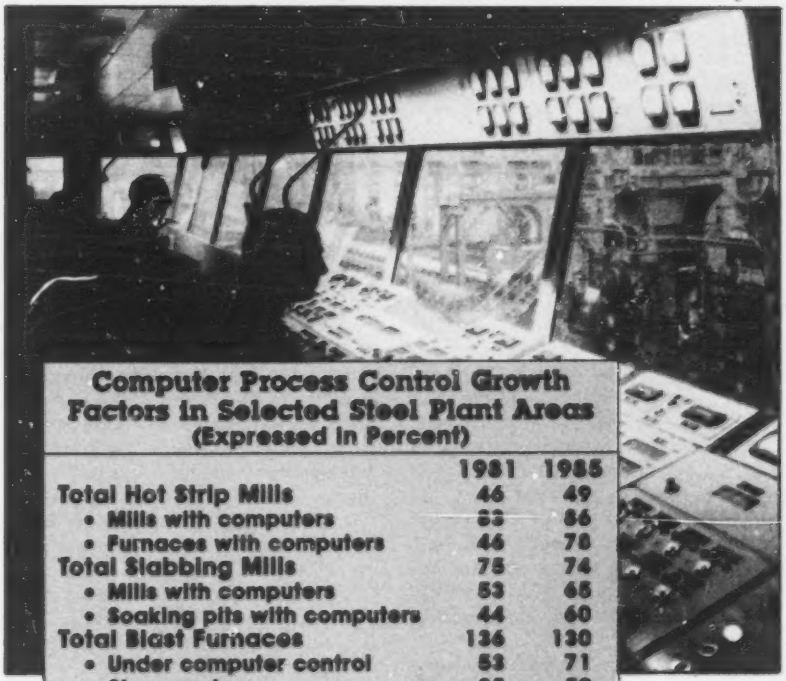
"I look at it as one of the few areas where it's possible to make significant improvements in quality and productivity without large capital investments," says Ronald Miner, manager of process systems in research at Republic Steel Corp. Republic is completing the installation of second generation computer systems in the company's basic oxygen shops.

As these comments suggest, the steel industry has quietly launched a drive to sharpen and extend process control systems. There are two broad trends. First, mini-computers and related devices are being used for direct local control of processes. Secondly, centralized, hierarchial systems are being used to coordinate different processes and supervise whole plants.

In part, this activity stems from advances in hardware technology. Minicomputers, micro-processors, and programmable controllers are making it practical and desirable to distribute the direct control of processes.

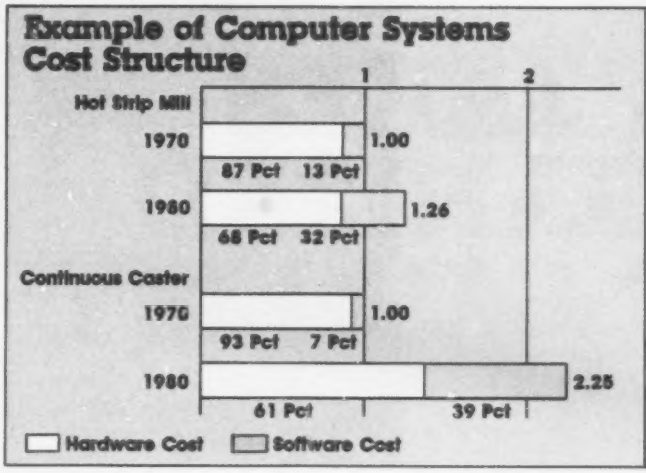
In addition, there is now the software for hierarchial systems. In the few large projects that are underway, multi-level networks are being installed in one swoop. Sophisticated control systems are considered a must for the big continuous casters now going in.

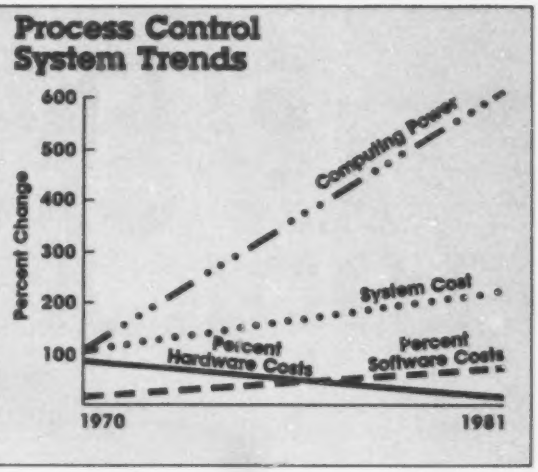
A unique aspect of the control program is that it involves a high degree of industrywide cooperation. There has been broad participation in the hierarchial system work of Theodore J. Williams, professor of engineering and director of the Purdue Laboratory for



Computer Process Control Growth Factors in Selected Steel Plant Areas
(Expressed in Percent)

	1981	1985
Total Hot Strip Mills	46	49
• Mills with computers	83	86
• Furnaces with computers	46	78
Total Slabbing Mills	75	74
• Mills with computers	53	65
• Soaking pits with computers	44	60
Total Blast Furnaces	136	130
• Under computer control	53	71
• Stove systems	35	59
Total Coke Batteries	150	144
• Under computer control	12	22





Applied Industrial Control.

"Over the past ten-year period," says Dr. Williams, "the North American steel industry, both U.S. and Canadian, has been carrying out a major cooperative study of overall hierarchial computer control systems..."

The American Iron & Steel Institute (AISI) is working with steel companies and government agencies to develop better sensing devices.

"The big hang-up in the past was that we didn't have the proper sensors," says Leonard E. Malin, general manager of process engineering for United States Steel Corp. The need for further instrument development is generally recognized.

"We seem to be at the point where the software has caught up with the sensors," says Mr. Maroney of Leeds & Northrup.

Most interesting, perhaps, is the planned industry approach to computerization. A task force of the Association of Iron & Steel Engineers (AISE) is working to make software portable. One aim is to make systems that are installed on a piecemeal basis compatable with the networks that will eventually be built. Another big goal is to avoid duplication of effort at different companies by making the software developed at one company interchangeable with the systems of others.

All of which is providing a body of technology for improved control of steel processes. As has been indicated, the improvement is needed partly to meet tight quality requirements. The auto companies, among others, are demanding that the mills provide high quality and that they document their quality control.

"They're requesting each supplier to show evidence that they're doing statistical process control," says Joseph Tuttle, industrial engineer at the Middletown Works of Armco Inc.

All the big mills are pushing statistical control. People are taking "an organized look at quality," says Donald Shiflett, general manger of management services for National Steel Corp. Jones & Laughlin has established an Integrated Quality Control System. Others have their own names.

The need to capture quality data is one of the reasons for computerization. "What the Japanese have done and what we would like to have is quality tracking," says Mr. Malin of U.S. Steel. At the Kimitsu Works of Nippon Steel Corp., they will record something like 5,000 process variables and hold that data for a year after the product is shipped.

At this stage of its statistical program, Armco feels broad, fundamental understanding is more important than high-powered electronics.

"We've trained about 400 people, now," says Mr. Tuttle. "They'll be training their turn foremen in the basics of statistical process control. We're avoiding the use of computers until these people applying statistical control understand the whole process."

Using simple charts and calculators, says Mr. Tuttle, people can get a grasp of process causes and effects. This approach has had significant impact in stabilizing operations. On an Armco hot strip mill, diversions were reduced from 20 to 25 a week to one to three.

Once the statistical concept has been ingrained, says Mr. Tuttle, more elaborate analysis can be employed. "There's a wealth of information we're capturing on process control computers."

Closely related to quality is the aim of efficiency through better control. There is great potential in their area for the simple reason that today's hardware is a lot better than what was available only a few years ago.

"Our BOF shops have been computerized for a long time," says Mr. Miner of Republic. "The systems that were in place were aging. We were able to make significant improvements in capacity and flexibility."

National Steel is going through a similar program of updating BOF controls. "We are substantially increasing the precision of the BOF control," says James N. Howell, engineering vice president for National. Improved yield and fewer reblows are among the benefits cited.

"Reliability and flexibility are improving," says Mr. Shiflett of National. "The cost performance is more attractive."

In a typical older system, a computer would calculate oxygen flow rates, lance heights and other variables. An operator would then use this information to turn valves and run drive systems.

In the distributed control system at J&L's Indiana Harbor plant, these physical acts are performed by a programmable control on instructions from the process computer. "The controller governs the oxygen blow period, automatically adjusts lance height, and changes the oxygen flow rates," says Mr. Henn of J&L.

In a growing number of cases, it's impossible to operate efficiently without a computerized control. Republic found this out when it installed a rotating top on a blast furnace at Warren, Ohio. The new method of burden distribution initially produced excessive lining wear.

The company had captured enough data to make an analysis. "We have a computer control system with the basic function of monitoring," says Mr. Miner. By sifting the data and adding some sensing devices, Republic was able to devise a distribution pattern that gave good lining life.

The continuous heat treating line being started at Bethlehem's Burns Harbor is being asked to anneal soft sheet and harden high strength sheet. "To

gain the productivity, the computer will be necessary," says James A. Barsic, supervisor of control systems at Burns Harbor. Mr. Barsic suspects that quality as well as efficiency would suffer without a computer.

The progress of control concepts is brought out by the advances made on a slabbing mill at Inland Steel. When the mill was installed in the Fifties, it was equipped with a punched card system of control. "They had a card for every ingot-slab combination," says Randy Pals of Inland. "They would put this card into a hard wire system."

This approach was very cumbersome and inflexible. Operators would often ignore the preplanned schedule because the steel was hotter or colder than it was supposed to be.

In March of 1981, Inland replaced the punched cards with a small computer. This got away from the awkwardness of handling a lot of cards but it still operated on a pre-planned pass schedule. Like the original system, the computer had the disadvantage of inflexibility.

In June of 1982, Inland went to a true computer control on the slabber. Rather than fixed schedules, the computer worked from a model and devised the optimum sequences for particular ingots and slabs. There was provision for the input of hardness variations due to temperature or composition.

In October of 1982, a further modification was the installation of a torque monitoring computer. "It gives us immediate feedback on how much work we're putting into the steel," says Mr. Pals. Still later last year, Inland made position regulation an internal function of the computer.

"This is very typical of the things we do," says Mr. Pals. "We've done a very similar kind of job on our 12-in. bar mill."

Inland's bar mill program is typical of how existing facilities are being upgraded throughout the industry. The potential in this regard was brought out when Chaparral Steel Co. modernized the drive and control system of a bar mill built in 1975.

Thyristor convertors were installed on all the main drives by ASEA Industrial Systems, Inc. These provided faster response and more accurate speed control. Overriding control was provided by a micro-computer based digital system. Apart from this, there were only minor modifications of the existing mills.

The impact of the changes were dramatic. "The payback time at Chaparral Steel was three or four months," says Ake Nilsson, section manager for ASEA.

The modernization was completed with a minimum of downtime. The control system was installed in 1982 between Christmas and New Year's. "The mill started up January 3rd with full production the first day," says Mr. Nilsson. "There was a total downtime of 10 hours during the first week for fine tuning."

ASEA has made 20 similar installations throughout the world. The company's system will go on the new mill of Talley Metals Technology in South Carolina.

" A number of tandem mills around the country need some kind of upgrading to be able to compete with imports," says Mr. Nilsson.

As has been indicated, much of the process control work is on a piecemeal basis. Dr. Williams of Purdue estimates it would cost around $100 million to install complete hierarchial systems on an integrated steel plant.

Even if money were availabie, it takes considerable time and brainpower to fully computerize a complete steel mill. Nippon Steel's quality tracking system gives some idea of what's involved.

"At Kimitsu, they told us it took three years to plan that system and 10 years to implement it," says William A. Kolb, senior applications engineer, U.S. Steel.

Nevertheless, there is work on computer networks that span more than one process. At Middletown, Armco has built up a broad control system.

"Most of our major operations were either retrofitted or originally had process control computers," says Mr. Tuttle. "They talk to each other by a coaxial cable. There are 10 miles of it running around the plant.

"They talk to the operations research system where we do models and simulations. They also communicate with our corporation communications center."

Armco feels it has been in the forefront of new computer technology. "One of the things we did was coin the phrase, ingot processing, when we were putting in our hierarchy here at Middletown Works," says Mr. Tuttle.

A Greenfield steel plant is being built by Timken Co. At Fairfield, Ala., U.S. Steel is installing a new caster and a complete seamless complex. It goes without saying that extensive computer control will be used in operations of this magnitude.

The Fairfield program provides a good view of the new control concept. Direct control of processes is distributed to separate local systems. "You need three basic types of first level control," says Mr. Kolb.

First, there is the instrumentation. Then, there are the controllers which move valves, rolls and other physical components. Finally, there are the programmable logic controls. These do the sequencing—the starting and stopping of conveyors and drives.

At this first level, various terms are used for microcomputers dedicated to different functions. "It's a little microprocessor on a chip," says Mr. Kolb. "The instrument people would take that chip and put it in a Leeds & Northrup or a Foxboro system. General Electric would take the same chip and put it in a drive controller."

At the direct control level, the microcomputer is characterized by high speed and relatively narrow functional ranges. "It's limited in its capacity to store data," says Mr. Kolb. "It's geared toward real time. You're talking milliseconds."

Various advantages are cited from distributed control. Compared to the earlier systems, it offers greater flexibility. "If you have a hard wire gage control, you have to go out and switch wires around," says Mr. Kolb. "If you have a computer, you just change a couple of consonants in the software and you run the strip mill a different way."

Localized controls are seen simplifying repairs. "You don't have to go in the big box and find out what's wrong," says Mr. Kolb. In start-up situations, individual control systems can be worked on at the same time.

Above the direct controls in U.S. Steel's scheme are level two minicomputers. These provide set-up information to the control systems. They track material through the process. Speed is less critical at this level of the hierarchy.

At Fairfield, U.S. Steel will have a level two computer for the bloom furnace. Another will handle the piercer and elongator. There are additional units for the mandrel mill, the stretch reducer, the heat treating, finishing and storage operations.

"It's like a foreman in every one of the areas," says Mr. Kolb. "Under the direction of them are the level one micro-computers which do the work."

The next step up is overall control of the pipe mill. "We have a level three computer which would be like the division superintendent," says Mr. Kolb. "It's basic function is to bring all tracking information together so it knows where everything is."

Ultimately, the level three computer will be pacing the operation, synchronizing the different steps. Beyond that, the pipe mill computer will be linked with the steelmaking and casting computers. The whole plant will move to the same beat.

Finally, the plant process control will

interface with the business computer. "We would consider that the fourth level," says Mr. Kolb. "The business computer gets all the orders and sets all the production schedules." Quality tracking and various types of analysis will be handled at level four.

All this describes the ideal system men are working toward. "Here is the hierarchy of distributed controls," says Mr. Kolb. "This is the way we've got to go. It's going to cost big bucks to do this."

With a shortage of bucks, he indicates, it's important to get the maximum use of brainpower. "The development costs for software are going up," he says. "Hardware is going down but the software development cost is going up."

It was to minimize the software cost that the AISE task force was formed. "If we develop software for a BOP shop in this facility, why can't you take that software and put it on a BOP shop over there? The physical reaction's the same," says Mr. Kolb.

There is another question being asked by steel producers. Why can't there be a closer coupling of steelmaking, continuous casting and hot rolling? With 20 large casters coming onstream, the desire for a non-stop flow of steel is providing extra impetus to the computer drive.

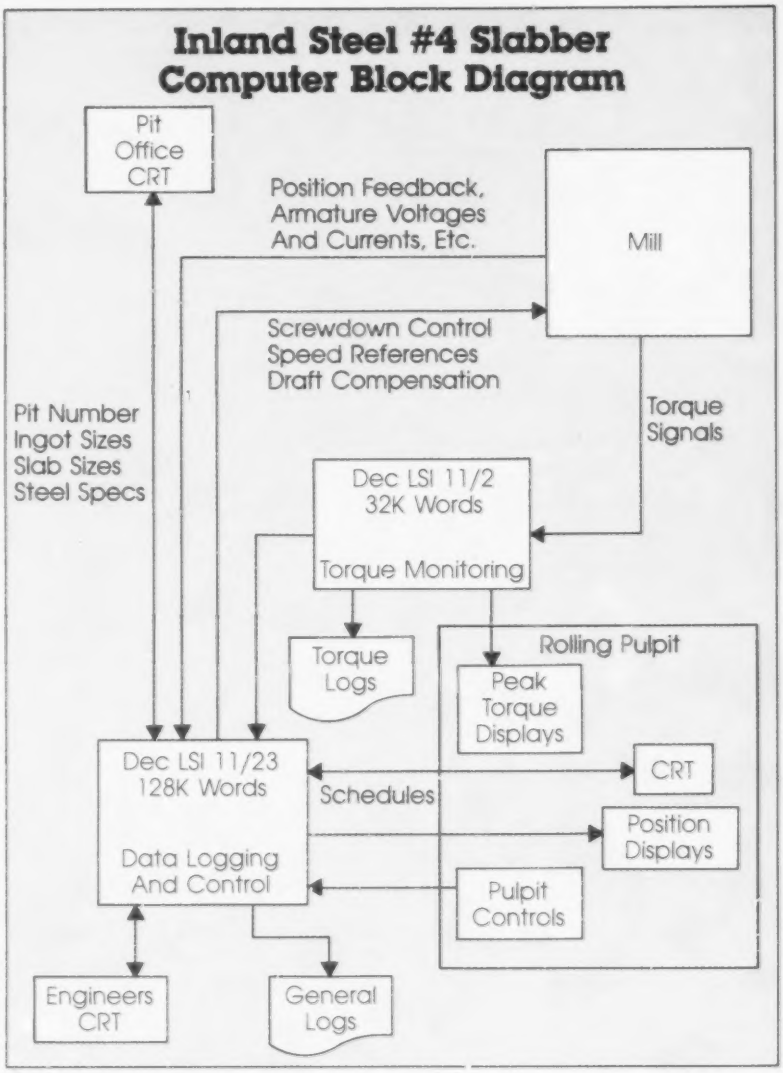
Apart from this, the sheer size and complexity of the new casters call for highly sophisticated control. At Indiana Harbor, Jones & Laughlin is installing two machines with combined capacity of more than 3 million tons a year.

The caster control system is being fitted into a hierarchy that is topped by a host computer. This is linked to the IBM corporate mainframes.

Under the host computer is a long, horizontal string of process control computers. The BOF computer is a memory base unit. Now being installed is the continuous casting computer. Planned for the future is the replacement of strip mill computers with new generation models.

In operation, the host computer receives the production schedule from the business computer. "After a heat is made or a slab is cast, a packet of information is sent back up through the host to the corporate mainframe," says Mr. Henn. "That is used for archiving and storage for later analysis." A portion of the analysis is done is J&L's new Integrated Quality Control System.

The host computer sends instructions down to the BOF computer first, then to the caster and strip mill computers. Material is tracked by the host as it goes from one process to another. J&L calls the tracking function management of materials flow.



There is continuous monitoring and adjustment at the central computer. If there is an upset at the caster, the host will go back to the BOF and modify its schedule.

"We get communications down from the host plus each one of these horizontal guys can talk to each other," says Mr. Henn.

Instructions from the host are primarily concerned with the operating sequence and the product specifications. The process computer will work with dynamic models in determining exactly how the end result will be achieved. The mechanics of operating the BOF are carried out by a programmable controller.

The BOF process computer adjusts its plan according to data fed back from the chemical lab computer.

The continuous casters at Indiana Harbor have 16 intelligence systems. There is a provision for making width adjustments on the fly. "We download from the computer when the width is to change," says Mr. Henn. "We drive in the mold faces to the new width. All this is done by automatic conversation with the process control computer."

Computers also regulate the flow of cooling water. "We've got all kinds of weighing systems which have their own little onboard computers that speak to the casting computer," says Mr. Henn.

"There's a lot of protocol and handshaking and error checking that goes on. We've got to make sure that the validity of the data is intact. There is always a 'Hello, are you there?' handshake."

A vast amount of operating information is logged and uploaded for subsequent quality analysis. In addition, there is a running check of something like 199 abnormalities. J&L plans to make extensive use of hot charging, and operators must know on the spot if a

slab will require cold inspection and conditioning.

Deviations from the prescribed mold levels or casting speeds are automatically noted. Some use is made of sensing devices. However, it is still considered desirable to have visual inspection of the hot slabs. J&L would love to have an automatic hot inspection device but isn't aware of any such animal.

A major concern of the control program is coordination of the caster with the steel shop. "One of the biggest software packages in the caster computer is obviously the management of metal flow," says Mr. Henn. For fully continuous casting, steel must arrive at the caster at the right time and at the right temperature.

With this in mind, the caster computer is constantly looking over its shoulder to see how the steel shop is doing. The caster computer is also advising the BOF of where it stands.

"The tracking of the BOF starts at the oxygen blow," says Mr. Henn. "The caster computer keeps looking back and there's a caster schedule on a CRT screen in the BOF pulpit."

The need for this kind of coordination is one of the big reasons for hierarchial control. If a big slab caster comes to a full stop, there are significant production losses.

"You now have to think of two processes as one," says Eugene A. Mizikar, director of technical analysis at J&L research.

The next big challenge for J&L's systems people will be to unify casting and hot strip mill operations. "We're doing an off-line simulation to see how we can schedule a hot strip mill and a caster so that we can maximize hot charging," says Mr. Henn.

This is quite a trick. The strip mills run more than 3,000fpm The caster casts at five or six feet per minute. The mill has to operate with a certain sequence of slab widths. The caster will be delivering some hot slabs and some cold slabs.

At Bethlehem's Burns Harbor plant, the new continuous heat treating line has a product mix that calls for very precise control with a high degree of flexibility.

For this job, Bethlehem has gone to a distributed system with three types of control. A process control computer receives information on orders from the plant's business system.

The process computer devises an operating schedule that will minimize temperature changes. The schedule is displayed to the operator, who gets the coils from storage in the order that they have been lined up by the computer. In devising temperature instructions, the computer looks ahead four or five coils. Temperature changes can't be made instantaneously and it is necessary to anticipate the arrival of a particular coil.

The actual operation of the line is controlled by two separate computers. A digital unit controls sequence and line speeds. During a temperature transition, the computer will speed or slow the line to provide the prescribed thermal treatment.

An analogue computer controls temperature by varying fuel flow and air in take on the basis of instructions from the supervisory computer. "A digital control is like a light switch with on-off positions," says Mr. Barsic of Bethlehem. An analogue is "like having a dimmer where you can control the intensity of the light."

The direct controls feed back information to the process computer. "It can make decisions on bumping the speed a little if there is a temperature change," says Mr. Barsic. "The programmable controller and the temperature controller are all working hand in hand."

Comparing the distributed system with what might have been installed 10 or 15 years ago, Mr. Barsic cites several differences.

"The temperature controller would have been done in analogue hardware. The sequencing function would have been done in relay logic. I'm not aware of any continuous annealing lines that had computer control 10 or 15 years ago."

Communications are simplified with distributed control, says Mr. Barsic, and you're not occupying up a large central computer with signals relating to only one specific task.

"You don't have to tie up a large computer doing little sequencing type of functions," says David Morton, superintendent of the Burns Harbor control department.

The heat treatment system at Burns Harbor is just one part of a plant network. Process computers talk to each other and the process system interfaces with the business system.

As has been indicated, it is a new generation of computer hardware that has made possible the systems of Burns Harbor and other plants. The Bethlehem line uses DEC 1144 (Digital Equipment Corp.) as the supervisory process controller.

The digital unit which controls sequencing is an AutoMate from Reliance Electric Co. The analogue unit for temperature control is from ECM Controls, Inc.

The Jones & Laughlin system at Indiana Harbor has a DEC 1144 as the host computer. This uses DEC software to communicate upward to the business system.

The Indiana Harbor BOF has a DEC 1124 computer. The continuous caster has a DEC 1144. "A Fisher instrumentation subsystem controls all the spray water flows, all the mold water flows," says Mr. Henn. "It has its own data highway linked into the DEC computer."

For direct process control, Armco is replacing existing computers with MODCOMP Classics (Modular Computer Systems, Inc.). "At higher levels, we're primarily using DEC 1170 units for what we call area scheduling," says Mr. Tuttle of Armco.

For U.S. Steel's Fairfield seamless mill, responsibility for individual control systems has been assigned to instrument, electrical and mechanical suppliers.

"The furnace on the front end would be Leeds & Northrup," says Mr. Kolb. "That would be the old heating furnace. The hot mill will be all General Electric. The two reheat furnaces would be all Davy McKee.

The quench and temper system is coming from Flinn & Dreffein Engineering Co. with computers from EMC. Zygo Corp. is providing level one measurement and sensing systems.

Morgan Construction Co. is building the mechanical equipment for the Fairless seamless mill. Morgan is also the prime contractor for the mill's automated process storage system. This will feature computerized stacking and retrieval of pipe.

"That's going to be quite a system," says Mr. Kolb of U.S. Steel. "It's like an automatic supermarket."

Kawasaki Steel Corp. has ordered an IBM Advanced Control System (ACS). This is a standard business model equipped with software, suitable for broad supervision. An ACS unit is being considered by STELCO, Inc.

"My feeling is the steel industry has been concerned with islands of operation," says Mr. Holland of IBM. "They're beginning to address plantwide control." IBM is planning a Pittsburgh workshop that will provide operators with hands-on control experience.

The control market has an international flavor. Process Corp. of Pittsburgh was recently awarded a contract that includes software for National Iron and Steel Mills, Ltd., of Singapore. Selective Electronics, Inc., which is Swedish-owned, has received four North American orders for its Optocar noncontact measuring system.

Raytek, Inc., of Santa Cruz, Calif., has supplied non-contact temperature measurement instruments to Allegheny Ludlum Steel Corp., Carpenter Technology Corp. and many others.

MR20

AccuRay Corp. of Columbus, Ohio, has just introduced a non-contact system designed to measure sheet thickness within a range of plus or minus 1 pct.

The spread of hierarchial control is tending to broaden the roles of suppliers. People are thinking more of systems and less of isolated components.

"All the suppliers are becoming more problem oriented," says Mr. Maroney of Leeds and Northrup.

"The market is looking for vendors who have a total capability," says Andrew S. Chatha, metals industry sales specialist for Foxboro Co. Foxboro is concerned with instrumentation in the liquid and heating stages of steelmaking.

Mr. Chatha notes that direct process controls must be effective before the large networks can function. "Before they get there, they have to upgrade their individual systems," he says.

"We feel as a company there's a lot more that can be done in the instrument area," he says. "There's a trend toward on-line instrumentation. People don't want to take a sample every so often."

One critical need is for a device that will make a hot inspection of continuously cast steel. Honeywell Inc. and U.S. Steel have done developmental work on such a system.

"Our program has just completed the concept phase," says Donald E. Waters, program manager for Honeywell. "We feel we have proved the feasibility of this concept. The Department of Energy is looking for the steel industry to put a consortium together to carry on this program."

Magnaflux Corp. has developed a new generation of automated inspection systems. These automatically sort out products with defects. The product is marked to indicate the location of the flaw.

For control of metal level in billet casting, Nippon Kokan has developed a pencil-thin detection head for a small eddy current sensor. Selective Electronics uses a non-contact laser measuring probe in a new molten metal monitoring device.

Raytek Inc. has come out with what it calls the first microprocessor-based infrared temperature measurement system. One of the aims of the steel industry is non-contact measurement of chemistry as well as temperature.

New sensing devices are being developed all the time. Not all suppliers are encouraged by the industry's response. "We've got a big bag of tricks here," says George J. Muska, manager of equipment sales and services for Koppers Co., Inc.

Koppers recently took on a broad line of European instruments and controls. "There's an awful lot of interest, but that's where it stops," says Mr. Muska.

There is considerable interest in monitoring and adjusting shape on sheet mills. At Warren, Ohio, Republic Steel Corp. has installed an ASEA shape control on a four-stand cold mill. Davy-Loewy has had more than 40 orders from aluminum and steel companies for its Vidicom shape meter.

Gould Inc. reports good results from its proximity sensors and programmable controllers in plate mill and pipe mill applications. Without making physical contact, the sensors can detect the presence of steel as close as 1mm and as far away as 50mm.

Closely linked to the instrument systems are the programmable controllers. These perform the actual control steps on the basis of signals from instruments and instructions from the process computers.

"The programmable controller is a relatively simple device that replaces relays," says Richard Clark of Westinghouse Electric. "They're programmed in a fairly simple way with ladder diagrams."

Until recently, there was a clear-cut distinction between control and instrumentation. "Programmable controllers have been on the digital side," says Byron Hartman, who is in application engineering at Allen-Bradley Co. "The instrument people have been on the analogue side."

There is now a blending of the two modes, Mr. Hartman indicates. Fisher Controls offers an interface unit which links its instrument system with programmable controllers. The interface accepts both discrete and analogue values from the controller. A Fisher system controls the cooling sprays on the J&L Indiana Harbor caster.

The controller area is active. "Our experience has been that the steel industry was behind and they're catching up fast," says William Roeder of Reliance Electric Co.

Eaton Corp's Cutler Hammer group recently came out with a self-prompting programmable controller. The operator is prompted through ladder diagram sequences.

Square D Co. provides a nine-inch screen for prompting the operator through the programming steps. A hand held programmer permits the operator to change the control steps. As has been said, this flexibility is one of the great advantages of the programmable units.

A new Westinghouse model can control up to 55 functions and offers a simple diagnosis system. Foxboro's new unit can be operated separately or be linked to an overall system. Gould's Modicon division has come up with a new, high powered unit.

Above the programmable controllers are the process computers and the supervisory computers. At this level, advances in both hardware and software have opened the door for distributed control. MODCOMP has come out with the smallest model of its CLASSIC line. This contains 512 K bites of ECCMOS memory and is available "at a very low price."

ECM Controls introduced a major new system last year. "There is tremendous emphasis on the operator console," says Robert Kot, director of marketing for ECM.

The idea, says Mr. Kot, is to make the computer "user friendly." He likens the industrial trend to what is happening in home computers. Small children can operate home units without being steeped in computer lore. The same general concept is being applied in plant controls.

"The software has been very complex for us to write," says Mr. Kot, "but very simple for the operator to use."

He sees continuing activity as steel mills upgrade their most efficient facilities, but he doesn't see many big steel projects being launched.

The big equipment and engineering companies are deeply involved in the design of broad control networks. "We're offering a distributed control system for, say, the hot mill," says Mr. Clark of Westinghouse Electric. "Starting with the reheat furnaces, it goes through the whole roughing and finishing trains, down through the run-out tables and the coilers.

"We will talk through our gateway to a supervisory computer or production scheduling computer and then break it down into areas."

One of the keys to this kind of system is high speed communication. With its data highway, Westinghouse provides a guaranteed update of 10,000 points a second. The company supplied the control system for the continuous annealing line of Inland Steel.

Dravo Corp. has designed the computer systems for a number of big melt shops. Portions of the individual controls systems are provided by equipment companies by Dravo has devised the overall architecture.

"One of the things we're shooting for is a paperless production flow," says Jeffrey L. Hoffman, senior systems analyst for Dravo. "Information is transmitted from computer to computer." □

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METALWORKING ORDER TRENDS

Prices firm up, but it's not a 'return of inflation'

Some headlines in early September declared, "Inflation is back."

That takes the prize for the silly headline of the month. It is true that producer finished goods prices in August did rise at a faster clip than they had for several months. But that's about it. And that is what the headlines were all about.

Finished goods prices at the wholesale level during August rose by 0.4 pct from July. That comes out to a 4.8 pct annual rise rate if the August pace were to be maintained for a year.

But in August, these prices were up by 1.4 pct from the year-ago month. That is the same year-to-year rate as scored in July.

And, most notably, the 1.4 pct rise rate in August was far less than the 2.1 pct average year-to-year pace through the first six months of the year.

So, the August producer price showing hardly calls for headlines declaring that 'inflation is back.'

Technically, of course, inflation never went away. Prices had not fallen prior to August; instead, the rate of price advances slowed.

Too, there was a special reason for most of the price rise in August. Food prices rose at a near-5 pct annual rate. This was due chiefly to the hot, dry summer that caused widespread crop damage. Food weighs heavily in producer price data, so the rise here did much to push up the overall August producer price data.

Still, there was one suprise in the August price data. Tags on capital equipment were up by 0.7 pct from July. This was the largest monthly increase in almost two years.

Labor Department analysts attribute much of the August capital equipment price rise to steep markups on tags for motor vehicles.

The analysts also noted that, "Prices for textile machinery, printing trades machinery and metal-cutting machine tools rose rapidly after little or no change in July."

Other capital equipment lines scoring accelerated price hikes in August: Aircraft and agricultural machinery.

The table here listing 22 key metalworking product lines shows a general continuing price softness. One-half of the listed products show price decreases or a no-change status in August.

The average over-the-year price of these products gives a true picture of the inflation rate. That's 2.0 pct.

Latest Month Covered: August, 1983

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	377.8	+ 0.2	+ 2.1
Metal Forming Machine Tools	416.2	0	+ 1.3
Agricultural Machinery & Equip.	327.1	+ 0.3	+ 4.8
Construction Machinery & Equip.	352.8	0	+ 1.8
Industrial Process Furnace & Ovens	362.4	+ 0.2	+ 2.1
Industrial Material Handling Equip.	285.1	+ 0.1	− 0.2
Pumps, Compressors & Allied Equip.	345.3	− 0.7	− 0.7
Fluid Power Equip. (Dec. 1970 = 100)	253.5	0	+ 2.8
Mechanical Power Transmission Equip.	314.9	0	− 0.2
Automobiles	218.4	+ 0.4	+ 1.6
Motor Trucks—Light	270.3	+ 0.3	+ 1.2
Motor Trucks—Heavy	313.6	0	+ 3.5
Railroad Equipment	357.8	− 0.1	+ 2.9
Fabricated Metal Structural Products	302.8	+ 0.2	− 0.5
Electric Motors	333.7	+ 0.9	+ 7.9
Valves (Metal, Ex-Fluid Power—Dec. 1982=100)	99.8	− 0.1	NA
Ball & Roller Bearings	330.9	0	− 1.3
Cutting Tools & Accessories	273.6	− 0.7	+ 0.7
Heating Equipment	244.8	+ 0.3	+ 2.7
Plumbing Fixtures & Brass Fittings	291.9	− 0.1	+ 6.3
Metal Containers	338.0	+ 0.2	+ 2.8
Miscellaneous Metal Products	287.6	+ 0.1	+ 1.5

Data based on U.S. Labor Dept.'s Producer Price Index

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	175	176	178	157
Buffalo	30	32	30	31
Pittsburgh	203	180	209	130
Youngstown	101	93	96	61
Cleveland	133	145	132	100
Detroit	96	84	111	110
Chicago	459	484	467	366
Cincinnati	102	100	86	67
St. Louis	76	73	72	51
Southern	152	150	149	74
Western	95	96	89	62
U.S. Production	1,622	1,613	1,623	1,209

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer .....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82, Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective September 26, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,622	1,613	59,719	56,164
Capability Utilization Rate	56.3	56.0	54.2	49.9

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 9/1/83)	26.822	26.822	26.217	25.297
Pig Iron* * (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.* * * (Gross ton=2240 lbs.)	$ 77.50	$ 77.17	$ 76.17	$ 55.50
No. 2 bundles	$ 45.50	$ 45.50	$ 45.50	$ 40.50

Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh .	$ 82.50	$ 82.50	$ 82.50	$ 57.50
No. 1 steel, Philadelphia	70.50	69.50	68.50	59.50
No. 1 steel, Chicago.....	79.50	79.50	77.50	49.50
No. 1 bundles, Detroit..	75.50	75.50	73.50	47.50
Low Phos., Youngstown	84.50	84.50	79.50	63.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	71.50
No. 1 mach'y cast., Phila	95.50	95.50	95.50	98.50
No. 1 mach'y cast., Chi..	109.50	109.50	109.50	103.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective September 26, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00-81.00 (Nom.)	76.00	8/29/83
Copper (C)	73.50-74.00	74.00	9/22/83
Lead	22.00-23.00	22.50-23.00	9/22/83
Magnesium Ingot	138.00	134.00-138.00	6/1/83
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	46.00	43.00-46.00	8/30/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $215.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $178.00
Bismuth, ton lots ..... $1.85-$1.95
Cadmium, ton lots $1.25
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $415.00
Indium, dollars per troy oz. ..... $3.20-$3.50
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$290-$300
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.65
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $11.98
Vanadium $4.94
Zirconium sponge ..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Sept. 19—572.64 Sept. 22—578.03
Sept. 20—574.34 Sept. 23—580.30
Sept. 21—572.65

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	72⅛	66½
Yellow brass	62⅞	59¼
Red brass	66⅞	62
Comm. bronze	67⅞	63¼
Mang. bronze	64¼	61¼
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	67
No. 2 copper wire	58
Light copper	49

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	63
No. 2 copper wire	54
Light copper	45
No. 1 composition	55
No. 1 comp. turnings	53
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	29
Radiators	46

Aluminum

New mixed clips	51	—52
Old sheet	49	—50
Old cast	49	—50
Clean dry borings	48	—49

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	50	—51
Mixed L.C. clips	48	—49
Old sheets and cast	48	—49
Borings and turnings	24	—25
Duraluminum clippings	29	—30

Copper and Brass

No. 1 copper wire	57	—58
No. 2 copper wire	50	—51
Light copper	45	—46
Radiators	37	—38
No. 1 composition	46	—47
No. 1 composition turn'gs	44	—45
Cocks and faucets	32	—33
Clean heavy yellow brass	30	—31
Brass Pipe	31	—32
New soft brass clippings	45	—46

Lead

Heavy soft lead	8	— 9
Whole batteries	3	— 4
Type metal	15	—16
Electrotype	13	—14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	50	— 60

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

EFFECTIVE SEPTEMBER 26, 1983

MATERIALS NEWSFRONT

(Effective September 26, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 82.00 to	$ 83.00
No. 2 hvy. melting	72.00 to	73.00
No. 1 dealer bundles	99.00 to	100.00
No. 1 factory bundles (auto)	97.00 to	98.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	94.00 to	95.00
Machine shop turn.	10.00 to	11.00
Shoveling turnings	35.00 to	36.00
Cast iron borings	34.00 to	35.00
Low phos. punchings plate	99.00 to	100.00
Heavy turnings	72.00 to	73.00
No. 1 RR hvy. melting	90.00 to	91.00
Rails 2 ft. and under	103.00 to	104.00
Scrap rails, random lgth.	91.00 to	92.00
RR specialties	98.00 to	99.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	600.00 to	610.00
18-8 turnings	500.00 to	510.00

Chicago

No. 1 hvy. melting	$ 79.00 to	$ 80.00
No. 2 hvy. melting	72.00 to	73.00
No. 1 dealer bundles	99.00 to	100.00
No. 1 factory bundles (auto)	99.00 to	100.00
No. 2 dealer bundles	44.00 to	45.00
No. 1 busheling	97.00 to	98.00
Shredder scrap	84.00 to	85.00
Machine shop turn.	25.00 to	26.00
Mixed bor. and turn.	26.00 to	27.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	44.00 to	45.00
Low phos. forge crop	99.00 to	100.00
Low phos. punchings plate ¼ in. and heavier	109.00 to	110.00
Low phos. 2 ft. and under	105.00 to	106.00
No. 1 RR hvy. melting	94.00 to	95.00
Scrap rails, random lgth.	81.00 to	82.00
Reroller rails	95.00 to	96.00
Rails, 2 ft. and under	102.00 to	103.00
RR couplers and knuckles	92.00 to	93.00
RR car axles	114.00 to	115.00
No. 1 machinery cast	109.00 to	110.00
Cupola cast	97.00 to	98.00
Stove plate	92.00 to	93.00
Steel car wheels	98.00 to	99.00
Stainless		
18-8 bundles and solids	570.00 to	580.00
18-8 turnings	470.00 to	480.00
430 bundles and solids	135.00 to	140.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	$ 69.00 to	$ 72.00
No. 2 hvy. melting	55.00 to	58.00
No. 1 dealer bundles	81.00 to	84.00
No. 2 dealer bundles	39.00 to	42.00
No. 1 busheling	81.00 to	84.00
Shredder scrap	82.00 to	85.00
Machine shop turn.	23.00 to	26.00
Mixed bor. and turn.	23.00 to	26.00
Shoveling turnings	41.00 to	44.00
Low phos. 5 ft. and under	81.00 to	84.00
Low phos. 2 ft. punchings	92.00 to	95.00
Electric furnace bundles	93.00 to	96.00
RR specialties	81.00 to	84.00
Rails, 2 ft. and under	94.00 to	97.00
Cupola cast	61.00 to	64.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	94.00 to	97.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 59.00 to	$ 60.00
No. 2 hvy. melting	57.00 to	58.00
No. 1 dealer bundles	75.00 to	76.00
No. 2 bundles	37.00 to	38.00
No. 1 busheling	73.00 to	74.00
Drop forge flashings	49.00 to	50.00
Machine shop turn.	30.00 to	31.00
Mixed borings and turn.	19.00 to	20.00
Shoveling turnings	30.00 to	31.00
Cast iron borings	27.00 to	28.00
Heavy breakable cast	35.00 to	36.00
Mixed cupola cast	51.00 to	52.00
Automobile cast	74.00 to	75.00
Stainless		
18-8 bundles and solids	470.00 to	480.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	$ 71.00 to	$ 74.00
No. 2 hvy. melting	49.00 to	52.00
No. 1 dealer bundles	87.00 to	90.00
No. 2 dealer bundles	37.00 to	40.00
Machine shop turn.	3.00 to	5.00
Shoveling turnings	7.00 to	10.00
Low phos. plate	83.00 to	86.00
Electric furnace bundles	78.00 to	81.00
Galvanized bundles	70.00 to	73.00

Cleveland

No. 1 hvy. melting	$ 67.00 to	$ 70.00
No. 2 hvy. melting	32.00 to	35.00
No. 1 dealer bundles	85.00 to	88.00
No. 1 factory bundles	90.00 to	93.00
No. 2 bundles	22.00 to	25.00
No. 1 busheling	84.00 to	87.00
Machine shop turn.	1.00 to	4.00
Mixed bor. and turn.	1.00 to	4.00
Shoveling turnings	3.00 to	6.00
Cast iron borings	6.00 to	9.00
Cut structural & plates, 2 ft. and under	99.00 to	102.00
Low phos. punchings plate	99.00 to	102.00
Drop forge flashings	37.00 to	40.00
Foundry steel, 2 ft. & under	57.00 to	60.00
No. 1 RR hvy melting	77.00 to	80.00
Rails, 2 ft. and under	105.00 to	108.00
Rails, 18 in. and under	106.00 to	109.00
Steel axle turnings	67.00 to	70.00
Railroad cast	80.00 to	83.00
No. 1 machinery cast	87.00 to	90.00
Cupola cast	60.00 to	63.00
Stove plate	45.00 to	48.00
Stainless		
18-8 bundles	325.00 to	335.00
18-8 turnings	275.00 to	285.00
430 bundles	80.00 to	85.00

Buffalo

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 58.00 to	$ 59.00
No. 2 hvy. melting	47.00 to	48.00
No. 1 busheling	69.00 to	70.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	30.00 to	31.00
Machine shop turn.	12.00 to	13.00
Mixed bor. and turn.	13.00 to	14.00
Shoveling turnings	17.00 to	18.00
Cast iron borings	12.00 to	13.00
Low phos. plate	69.00 to	70.00
Structural and plate, 2 ft. and under	70.00 to	71.00
Rails, 2 ft. and under	78.00 to	79.00
Scrap rails, random lgth.	82.00 to	83.00
No. 1 machinery cast	67.00 to	68.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 69.00 to	$ 70.00
No. 2 hvy. melting	58.00 to	59.00
Foundry steel, 2 ft.	57.00 to	58.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	55.00 to	56.00
Machine shop turn.	17.00 to	18.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	35.00 to	36.00
No. 1 RR hvy. melting	79.00 to	80.00
Rails, random length	76.00 to	77.00
Rails, 18 in. and under	92.00 to	93.00
RR specialties	85.00 to	86.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	75.00 to	76.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	97.00 to	98.00
Unstripped motor blocks	57.00 to	58.00

Birmingham

No. 1 heavy melting	$ 70.00 to	$ 71.00
No. 2 heavy melting	64.00 to	65.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	50.00 to	51.00
No. 1 busheling	71.00 to	72.00
Shredder scrap	87.00 to	88.00
Machine shop. turn.	24.00 to	25.00
Shoveling turnings	32.00 to	33.00
Cast iron borings	33.00 to	34.00
Electric furnace bundles	67.00 to	68.00
Elec. furnace, 3 ft. & under	64.00 to	65.00
Structural and plate, 2 ft.	94.00 to	95.00
Structural and plate, 4 ft.	90.00 to	91.00
No. 1 RR hvy. melting	71.00 to	72.00
Scrap rails, random lgth.	81.00 to	82.00
Rails, 18 in. and under	94.00 to	95.00
Angles and splice bars	88.00 to	89.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	64.00 to	65.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 60.00 to	$ 61.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	28.00 to	29.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	9.00 to	10.00
Cast iron borings	13.00 to	14.00
Low phos. 18 in. and under	88.00 to	89.00
Rails, random length	70.00 to	71.00
Rails, 2 ft. and under	66.00 to	69.00
No. 1 cupola cast	66.00 to	67.00
Heavy breakable cast	33.00 to	34.00
Drop broken cast	79.00 to	80.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00 to	$ 35.00
No. 2 hvy. melting	30.00 to	32.00
No. 2 dealer bundles	22.00 to	23.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	10.00 to	12.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	38.00 to	39.00
Heavy breakable cast	14.00 to	15.00
Stainless		
18-8 prepared solids	490.00 to	510.00
18-8 turnings	390.00 to	410.00
430 prepared solids	70.00 to	80.00
410 solids	60.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 45.00 to	$ 47.00
No. 2 hvy. melting	35.00 to	37.00
No. 1 dealer bundles	57.00 to	59.00
No. 2 bundles	31.00 to	33.00
No. 1 busheling	57.00 to	59.00
Shredder scrap	57.00 to	59.00
Machine shop turn.	5.00 to	7.00
Shoveling turnings	9.00 to	11.00
No. 1 machinery cast	95.00 to	100.00
Mixed cupola cast	30.00 to	32.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 42.00 to	$ 44.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	13.00 to	15.00
Machine shop turn.	6.00 to	8.00
Cast iron borings	6.00 to	8.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	29.00 to	31.00
No. 1 dealer bundles	27.00 to	29.00
No. 2 dealer bundles	10.00 to	12.00
Machine shop turn.	6.00 to	8.00
Shoveling turnings	10.00 to	12.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under (foundry)	85.00 to	87.00
No. 1 cupola cast	87.00 to	89.00

Seattle

No. 1 hvy. melting	$ 59.00 to	$ 61.00
No. 2 hvy. melting	48.00 to	50.00
No. 2 bundles	38.00 to	40.00
No. 1 cupola cast	94.00 to	96.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 60.00
No. 2 heavy melting cut 2 ft. and under	57.00
No. 1 dealer bundles	65.00
No. 2 bundles	35.00
Mixed steel scrap	39.00
Bush. new fact. prep'd.	63.00
Bush. new fact. unprp'd.	55.00
Machine shop turn.	30.00
Short steel turn.	33.00
Mixed bor. and turn.	20.00
Cast scrap	53.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 76.00 to	$ 77.00
No. 2 hvy. melting	58.00 to	60.00
No. 2 bundles	37.00 to	38.00
Machine shop turn.	21.00 to	22.00
Crushed turnings	39.00 to	41.00
Shredder scrap	76.00 to	77.00
Cut structural plate 2 ft. and under	91.00 to	94.00
Unstripped motor blocks	57.00 to	59.00
Cupola cast	78.00 to	80.00

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B6 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C8 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Molitrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N8 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Sadford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities* / City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (18 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	22.59	29.06	30.30	30.14	21.54	22.00	17.19	31.50	38.37	50.60	69.58	73.19
Baltimore	24.14	29.19	34.19	35.43	23.60	21.91	20.13	44.87	54.85	65.06	71.57	76.32
Birmingham	22.92	27.10	30.88	30.52	22.33	23.20	17.38	33.84	49.31	68.90	68.16	74.43
Boston	25.11	28.66	31.76	40.03	32.15	35.37	20.00	39.39	50.76	55.81	65.08	71.03
Buffalo	24.57	32.12	37.61	41.68	32.91	28.77	17.88	40.38	40.10	48.82	56.33	64.06
Chicago	25.07	31.37	32.70	32.32	22.71	23.35	16.58	30.33	36.47	40.64	46.01	52.05
Cincinnati	24.46	29.11	32.58	32.26	23.70	23.49	17.63	30.51	35.04	39.58	43.36	49.78
Cleveland	25.89	30.80	34.20	34.38	26.55	27.35	16.07	30.26	34.02	39.96	44.02	50.99
Denver	33.10	38.91	38.13	41.68	34.45	35.59	21.42	41.66	51.78	59.12	67.82	70.99
Detroit	25.72	31.94	34.08	35.88	28.05	29.93	17.10	31.85	35.74	40.44	48.09	52.99
Houston	22.36	28.61	31.90	37.78	32.24	35.46	17.85	39.48	39.28	45.22	53.75	60.10
Kansas City	21.35	26.53	31.75	29.42	26.77	28.84	18.15	33.30	38.29	48.53	53.40	62.04
Los Angeles	25.20	31.50	36.22	36.97	33.73	32.55	27.00	40.90	50.17	58.10	63.85	73.22
Memphis	26.12	33.39	33.91	34.55	27.96	34.24	19.47	37.60	45.09	49.96	59.80	69.44
Milwaukee	24.86	30.72	32.54	32.01	23.77	26.33	15.92	30.87	35.95	41.55	45.68	52.45
New York	22.03	30.31	33.26	39.11	27.90	32.37	19.13	42.13	45.80	53.04	62.17	69.31
Philadelphia	26.39	35.11	36.92	46.96	30.86	36.97	19.70	39.64	48.41	52.86	62.06	69.23
Pittsburgh	26.55	32.66	35.16	41.38	32.45	29.51	20.41	41.30	46.51	54.05	61.11	68.86
Portland	25.66	33.27	38.17	31.11	31.04	34.76	27.50	44.85	49.78	57.74	70.44	....
San Francisco	25.76	32.84	36.85	34.81	29.48	32.20	28.78	48.02	57.14	68.13	76.05	84.10
Seattle	27.74	32.32	36.16	40.49	29.35	30.37	29.55	50.60	63.37	71.57	76.28	87.67
Spokane	21.00	30.34	34.28	37.91	33.00	33.75	21.50	43.01	43.20	47.52	....	58.32
St. Louis	24.07	30.42	32.35	33.03	28.14	27.29	16.48	32.42	34.06	39.65	47.02	53.40
St. Paul	24.39	27.90	31.48	32.42	26.33	28.12	15.45	32.93	34.26	39.60	44.90	52.20

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ¾-2 15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1¾" round; Cold drawn—1" round; Hot-rolled 4140—1⅞" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

STEEL PRICES

Codes identify Producers listed in the Key on page 106. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A.—Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10, U1	$453.00
R3	$453.00
Midwest	
R3, U1, W5	$453.00
S1	$420.00
C10	$453.00
K2	$453.00
W5	$453.00
West	
B3(2)	$463.00
C6	$453.00
South	
A7	$453.00
Alloy, East	
R3, C10	$492.00
B3	$492.00
Midwest	
W8, W5, C10	$492.00
U1	$492.00
R3	$492.00
S1	$459.00
West	
B3	$502.00
C6	$469.00
South	
A7	$492.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7	24.15
C20	22.90
W8	22.90
I3, T10, U1, N4	23.90
West	
C6	25.10
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	23.90
W8	24.15
U1	22.90
I3	23.90
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	23.90
I3	23.90
West	
U1	24.40
C6	24.15
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut ll Edge—all widths, East	
U1	23.75
J3, B3	22.05
Midwest	
A7, D1	22.05
I4	21.45
S1, J3, D1	22.05
W3	22.05
N4	22.55
W5	23.75
U1	23.75
B3, G2, I3, M2, R3, G3	22.05
West	
K1	20.80
B3	28.55
South	
R3	22.05
Cold-Rolled, Carbon Max. .25%, East	
E4	29.75
R7, S10	29.60
P15	24.80
S7	Cmp*
U1	36.30
D1(1)	Cmp*
B4	33.60
Midwest	
G4	24.80
I4	35.30
W14	22.95
S1, J4	34.05
T4	Cmp*

*Composite pricing

High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, (plus extras)†	
Midwest	
M2, G3, R3, W3, I4, J3, G2, I3	22.05
A7	22.05
S1	22.05
West	
K1	22.05
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)†	
S1	24.60
G4	25.80
I4	23.70
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	47.25
P15	32.10
Midwest	
I4	41.80
S1	42.30

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	22.05
J3	22.05
U1	23.75
Midwest	
A7, B3, G2, G3, I3, M2, R3, W3	22.05
S1, D1	22.05
J3	22.05
I4	21.15
U1, W5	23.75
West	
U1	24.25
K1	22.05
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2)	26.15
J3	26.15
U1	29.15
Midwest	
B3, I3, G3, R3, M2	26.15
G2, W3, M11	26.15
I4	22.00
J3, A7	26.15
S1, D1	26.15
U1, W5	26.15
West	
U1	28.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	28.00
U1	30.30
Midwest	
J3, D1	28.00
I3, S1	28.00
A7, R3, Y1	28.00
G2, W3, M11	28.00
U1, W5	30.30
West	
K1	27.15
U1	30.80
South	
R3	28.00
Enameling, Midwest	
U1	29.85
S1, A7, I3, J3	27.65
Long-Terne, Midwest	
W5	31.65
U1	31.65
R3, A7	29.35

†Actual weight basis

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate

	per base box
Single Reduced (70 lb)	
East	
B3, J3	$26.29
U1	27.74
Midwest	
S3	$26.29
U1	27.74
J3	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$26.79
U1	28.24
South	
U1	$27.74
Double Reduced (55 lb)**	
Midwest	
M11	$21.49
B3, J3	21.49
U1	22.37
W3	21.49
W5	21.49
West	
K1	$21.99
U1	22.87
South	
U1	$22.37
Black Plate	
Single Reduced (75 lb)*	
East	
B3	$23.36
Midwest	
J3	$24.01
M11	24.01
I3, W5	24.01
W3	24.01
U1	25.26
West	
K1	$24.01
U1	25.26
Double Reduced (55 lb)	
East	
B3	$18.93
Midwest	
M11	$18.93
W5	18.93
J3	18.93
W3	18.93
W5	18.93
U1	19.70
West	
U1	$19.70
South	
U1	$19.70

*70 lb—base weight extra 45¢
**50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled (Special quality)

East	
R3, K3	25.80
R5	25.80
B3(3), J3	25.80
U1, C10	25.80
Midwest	
A7	23.95
U1, I3, I4, C20, N4	25.50
R3, T10	25.80
K2	25.80
I3	19.50*
West	
R3	25.80
C6	24.45
South	
A8	20.05
A7	25.80
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
C21	21.15
J3(4), L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	31.00
M1	23.025
B4, C10	31.00
Midwest	
B5, W10, Y1, W8, R3, M9	33.25
J3	31.00
B1	19.80
L2	30.75
N8	31.00
P3	19.85+CMS
W14	22.20
J3(3)	31.00
J2	31.00
West	
B5	34.90
R3	37.15
South	
B5	32.85
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10, U1	27.95
R3	27.95
J3	27.95
Midwest	
A7, U1, R3	27.95
I3, C10	27.95
I4	24.85
I3	21.00*
West	
B3	27.95
B5	18.50
C6	26.60
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	37.90
M1	28.025
R4	25.65
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	34.25
Midwest	
R3, C10	37.35
C2	28.275
J3, W10	34.85
P3	22.75
B1	22.70
N9	34.85
L2	34.85
B5	37.10
J3	36.00
J3	34.95
M9	37.10
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3(2), U1	25.75
L4	25.75
P2	25.75
J3	26.75
Midwest	
B3, R3, S1	25.75
I3	24.25
J3, A7	22.80
U1, I4	25.75
R3	26.75
West	
A7, C6, O2	24.25
K1	23.50
U1, B3	25.75
South	
R3	25.75
A7	25.75
U1	25.75
Alloy, East	
B3, J3	33.55
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	33.55
G2, G3	33.55
I4, U1	33.55
West	
B3	32.05
O2	30.55
K1	31.30
South	
A7	27.55
U1	33.55

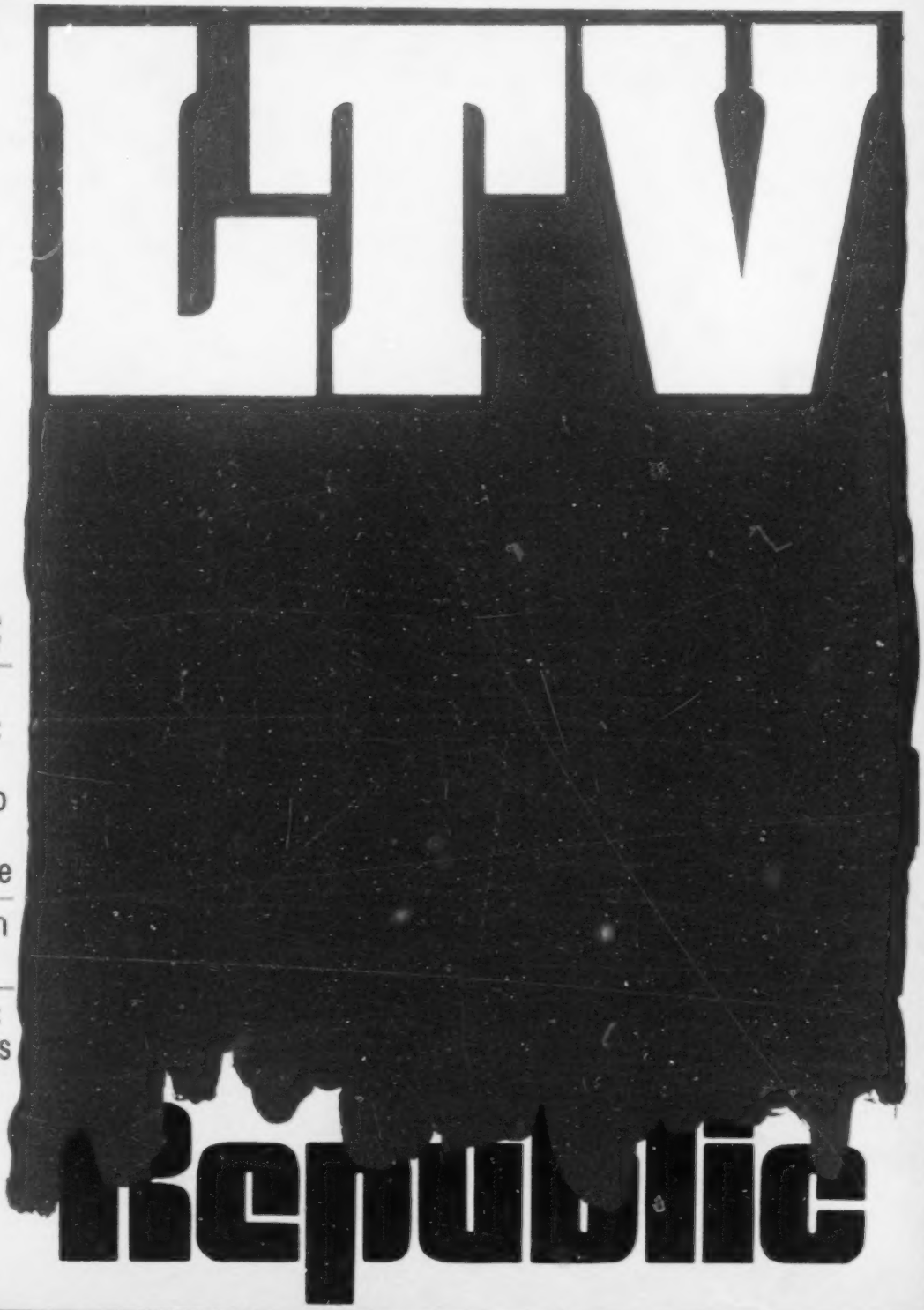
Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
U1	27.70
A7, R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
A7	25.95
C6	24.95

Chilton's
OCTOBER 21, 1983

IRON AGE

THE MAGAZINE FOR METALWORKING MANAGEMENT



LTV CLOSES IN ON REPUBLIC

Manufacturing Systems Series 45: Industrial Data Bases — The Key to Productivity in the Factory of the Future

Aluminum Back on Track in '84

Legislative Update: Congress Continues to Skirt the Big Issues in Industry

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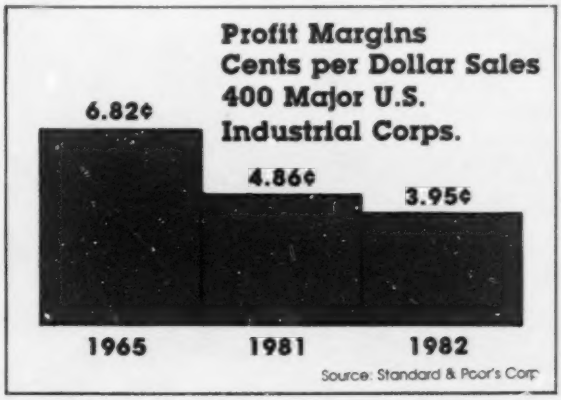
BUSINESS FINANCEFRONT

Recovery brightens corporate bottom lines—and more

Profits of U.S. corporations are bigger—and better.

Earnings of companies are not only swelling in dollar volume, but they are also improving in terms of profit margins—profits earned per each dollar of sales—and in returns on investment.

Last year, profit margins of U.S. industrial corporations hit a 30-year low, according to Standard & Poor's Corp.



They came to 3.95 cents earned for each dollar of sales. This was down from 4.86 cents in 1981.

A really stark perspective on last year's poor showing in margins is seen in comparing it with a peak margin of 6.82 cents reached in 1965.

Profit margins are a prime indicator of corporate financial health. For example, a company could have a steady rise in dollar volume profits and still be heading into trouble, if its margins are slipping.

This situation would indicate that profits were sustained only by rising sales volume, that less and less was actually being earned on each dollar of sales. A setback in sales volume, in such a scenerio, could quickly lead to net losses for a company. The company might not be able to ride out bad times—which seem to occur and recur quite frequently in the U.S. economy.

All this is why any news of improvement in corporate profit margins is good news. Standard & Poor's analysts say that margins are now showing gains throughout U.S. industry following the margins debacle of last year.

Further good news comes from the Federal Trade Commission (FTC), which monitors profit margins of manufacturing companies. The FTC says after-tax profits on sales of these companies rose to 4.2 pct in the second quarter of this year, up from 3.2 pct in the first period.

Manufacturers' profit margins still have a long way to go to recoup ground lost during the last three recessions. In 1974, that margin came to 5.9 pct.

Another good sign for earnings health of manufacturers is seen in returns earned on shareholders' equity. This is the big-scale corporate return on investment. In the second quarter of this year, this return for all manufacturers came to 11.1 pct, up from 8.0 pct in the first quarter.

All this improvement in margins and returns is abetted by the second quarter dollar profits showing for all U.S. corporations. The U.S. Commerce Department reports these after-tax earnings rose to $127.2 billion at an annual rate, up about 18 pct from the opening period of the year. The $19 billion rise was the largest for any quarter.

In dollar volume profits, the gains are real ones. Inflation is no longer severe enough to distort reported data with 'paper' profits.

Recession-haunted companies are slow to pay bills

Many companies are only slowly snapping back from the thumping they took through two recessions in the last three years. Executives in these companies still try to keep their operations lean and keep a tight hold on cash. This sometimes shows up in slow payment on due accounts.

U.S. companies reported that a smaller percentage of their accounts receivable were paid when due in the second quarter than in the first quarter. On a seasonally adjusted basis, paid-on-time accounts receivable in the second quarter came to only 74.5 pct of all due accounts. That was down from 75.7 pct in the first quarter. In fact, the second quarter on-time payment percentage was the lowest since the cyclical bottom of 74.3 pct hit in the opening period of last year.

These findings were revealed by TRW Inc.'s Services Div. which regularly monitors business credit accounts.

TRW analysts don't see any new slow-pay trend setting in. "The second quarter statistic," they say, "is in line with the trend of the last three years."

That trend, point out the credit analysts, shows the seasonally adjusted percentage of current accounts receivable "ranging between 74 pct and 76 pct since the middle of 1980."

On-Time Payments, Pct On Current Accounts, Seas. Adj.

1982			1983		
1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.
74.3	75.2	75.5	75.5	75.7	74.5

High long-term real interest rates hurt plant investment

"Capital spending is one thing we're really sweating out."

That's what Robert Ortner, the U.S. Commerce Department's top economist, said after announcing a strong showing for the U.S. economy in the third quarter.

In the aftermath of the GNP announcement, several private economists targeted in on the weak capital spending sector. Their conclusion: High interest rates on long-term bonds are keeping a lid on plant investment.

As of mid-September, according to Moody's Investor Service, the average yield on industrial corporate bonds was 12.5 pct. With the economy's inflation rate at about 3.5 pct, this puts real long-term rates at near-record alltime highs.

Explains one financial executive, "If my company issued a bond to finance plant investment, we would be selling goods at low price levels reflecting the low inflation rate. But we would be paying off the loan with highly-inflated, or high-price, dollars."

STEADY GAINS IN OUTPUT AND PRICES MARK ALUMINUM'S RECOVERY

The industry seems less inclined to consider shutdowns of uneconomical capacity now that shipments are on the rise and prices have firmed.

BY ROBERT J. REGAN

When aluminum industry executives gather at the annual meeting of the Aluminum Association this week in Washington, they will look back on 1983 as the year demand returned and look forward to 1984 as the year they expect profits to do the same.

It's no secret that a lot of red ink was spilled during the first half—in the operating profit columns, at least. About the best off-the-cuff assessment anyone would offer about the third and fourth quarters has been that things are edging up into the black.

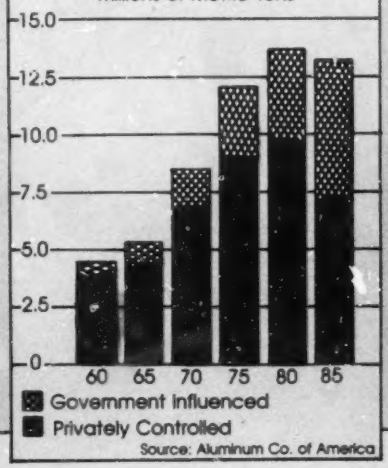
During annual meeting time last year, the buzzword was "leaner" and was used to describe the condition the industry was striving toward via management and work force pruning, shifts in product mix, shutdown and phasing down of unprofitable products and facilities, careful management of inventories and cash flow. The process has been helped along by steady improvement in demand and aluminum prices, but the most visible manifestation to date has been a steady--and continuing—rise in aluminum production and recovery of aluminum scrap from cans and other sources.

A year ago, prices were on the floor, particularly for ingot, and most of the talk was about permanent shutdown of uneconomical ingot capacity. But, with 1983 shipments starting to look like a 15 pct gain on last year's poor volume and industry analysts projecting another 10-15 pct rise in 1984, there doesn't seem to be much of a hurry. (And the Bonneville Power Administration's latest rate proposals may mean more second thoughts about what primary capacity goes down and where.)

Some capacity has come off the

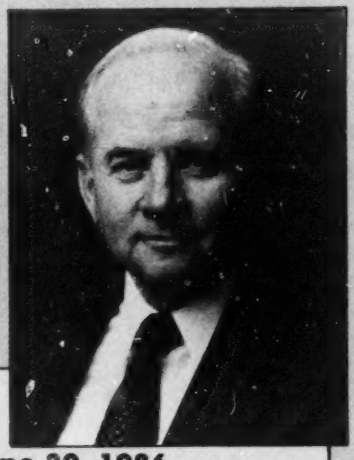
C.W. Parry
Chairman, Aluminum Co. of America

Comparison of Free World Primary Aluminum Capacity Ownership



Source: Aluminum Co. of America

C.F. Fetterolf
President, Aluminum Co. of America



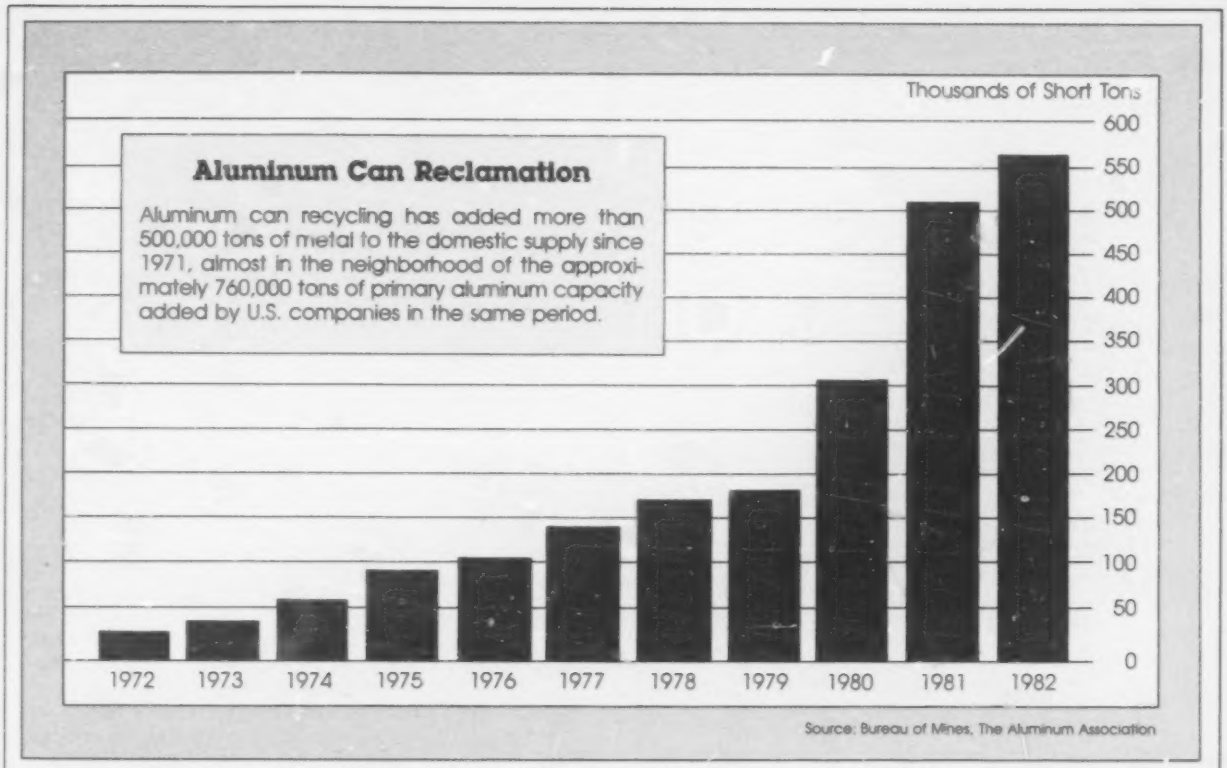
Free World Primary Aluminum Capacity June 30, 1983 vs. June 30, 1986

(Thousands Metric Tons)

	June 30, 1983	June 30, 1986
Nor'h America	6,108	6,221
Europe	3,646	3,653
Latin America	1,063	1,308
South Asia	920	1,030
East Asia	800	750
Australia-New Zealand	713	1,106
Africa	623	623

Source: International Primary Aluminum Institute, London.

Projected growth in free world primary aluminum capacity falls short of 6 pct over the next three years. Before the end of that period, according to calculations by Aluminum Co. of America, about half total primary capacity will be accounted for by "government-sponsored smelters without an assured market or fabricating affiliate for most of their metal."



books since the depths of the 1981-82 slump, mainly in Japan and the United States. More remains in that limbo that was defined as "idled capacity that may never be reactivated."

Aluminum Co. of America, which took its gas-fueled Point Comfort, Texas, smelter off the books last year, is taking its remaining 1.56 million short tons of domestic capacity up to 100 pct to keep up with demand. Charles W. Parry, Alcoa chairman and CEO, says there is "pretty solid underlying strength—solidly based—in the domestic market. There's been some firming abroad, like Europe and Australia, but they're not improving at the rate we are."

Alcoa President C. Fred Fetterolf said bookings during September were going "at a rate that looked like they couldn't be sustained. There is some inventory building going on out there and there probably will be a period of leveling off—but that leveling off will start at a very high level.

"I would have to say the recovery looks good, not fragile, but you might get as many different answers to that question as people you ask."

Mr. Fetterolf said flat rolled business was particularly strong and that Alcoa was booking December and January business during the early weeks of September. He also said the company is weighing a major modernization program designed, among other things, to build sizable capacity to produce wider can stock. That product is finding great favor with the can companies because they can blank more cans per sheet and speed production.

He emphasized that the program "is not a matter driven by a desire to expand capacity; it's better quality and more width capacity we are after." Asked where the new equipment would go in, he indicated it probably would be Alcoa, Tenn., but added there were other options. Those presumably would be Alcoa's Warrick, Ind. facilities or a greenfield site.

William O. Bourke, president and chief operating officer of Reynolds Metals Co., noted that third quarter industry shipments "overcame the usual seasonal weakness" and were up about 16 pct from the same 1982 period. "We now project industry shipments in the fourth quarter to reach 1.74 million tons for an 18 pct gain on the depressed fourth quarter of 1982."

Asked if, in view of all the talk about a contracting primary aluminum capacity base and rising demand, the market is heading for supply stringencies in 1984-85, Mr. Bourke said, "while the supply-demand situation in aluminum may be tight during certain periods of 1984, we do not anticipate any overall shortage next year. The industry always has and always will provide the capacity necessary to meet demand."

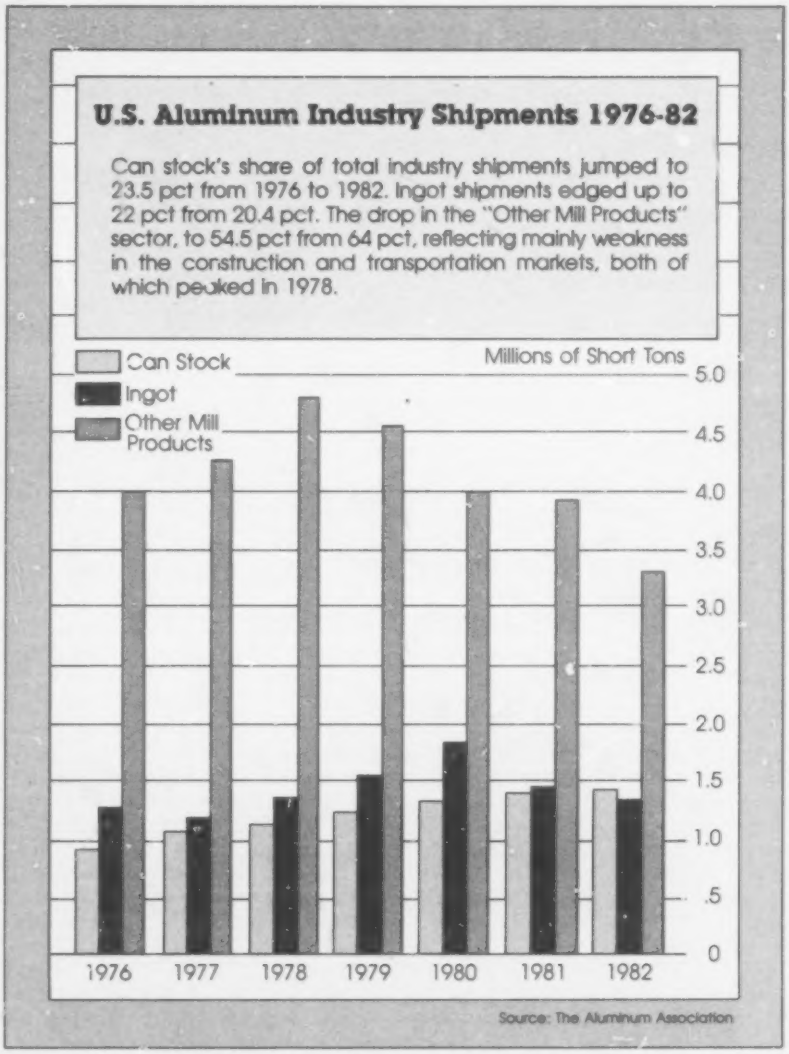
Alcoa and other integrated aluminum companies have over the past year or so pointed to the increasing influence of "stand-alone" aluminum smelters under the sponsorship of various governments that have no assured market or fabricator affiliates for large portions of their output. This output helped depress ingot prices during the recent slump and the effect was instantly visible via the London Metal Exchange's aluminum contract.

Alcoa has projected that the government-influenced smelters will account for nearly half of Free World capacity by 1985 and most of the projected/predicted smelter shutdowns have been in the private enterprise column. However, most of the integrated aluminum producers are reluctant to say that the stand-alones will be in a position to call the shots on ingot prices during boom times as they have been able to do when the market is in surplus.

Said Alcoa's Mr. Parry, "It's the whole aluminum community—when demand is down and the need to sell is there, it doesn't make any difference, and you can't say the integrated producers do one thing and the stand-alones do another."

Mr. Bourke said ingot pricing "will always be a function of supply/demand situations, regardless of who is selling or whether sales are made directly or via metal exchanges." He said aluminum will continue to become internationalized and "there will undoubtedly be significant changes in the industry worldwide. . .but no one at this juncture can predict how they might affect either pricing or various markets."

When the question was put (somewhat convolutedly) before Roy A. Gen-



tles, president and CEO of Alcan Aluminum Corp., he quipped, "Is this a question or a statement?" As for generalized projections of the probable influence of government-controlled smelters, the LME and the upcoming New York Commodity Exchange aluminum futures contract, he said, "your guess is as good as mine."

As for current and near-term aluminum business, Mr. Gentles said 1983 volume "has easily outdistanced 1982. Demand has picked up and been sustained in the building/construction and automotive markets, strong demand continues for can stock and packaging markets, and our third party ingot sales have been spectacular. The only unsettled area is distributor sheet."

Mr. Gentles also said that he does not expect any immediate pressure from the startup of Arco Aluminum Co.'s new rolling mill in Russellville, Ky. The startup may not come until the first or second quarter, he said, adding "and you don't start up a plant and immediately start selling gobs of material."

Alcoa's Mr. Fetterolf noted that the Japanese quickly followed the Aug. 1 price hike on aluminum can stock by North American producers. "Now," he said, "they probably protected themselves with metal purchases through 1983—at least through 1983, and maybe further—and they can hang in there for sometime afterward, even if it means just trading rigid container sheet for dollars. Their idea probably is to stay at it (exporting can stock) until their own requirements grow to a point that will satisfy those big rolling mills.

"How long will that take? Off the top of my head, I would say maybe five or six years."

As aluminum production and can recycling grow, more raw material is generated and there are more processors scrambling for it. Asked if the aluminum industry was about to enter a new age of mini-mills with their own scrap sources and modest rolling equipment, Reynolds' Mr. Bourke replied that most of the can stock produced today comes off modern, high-speed rolling mills that have the power, speed and shape, and gauge controls needed for the thinner gauges and stronger alloys.

Asked if the aluminum producers have moved into a position to tolerate modestly higher energy costs now that the prices are at or near recovery levels and costs are under better control, Mr. Bourke said, "Yes—but only modestly, because the price restorations and cost cutting were only catch-up moves after three years of dramatically increasing costs and depressed prices."

The aluminum producers' latest dose of rising energy costs came with the 26.8 mils power rate set by the Bonneville Power Administration. It came at a time when Alcoa, Reynolds and Kaiser Aluminum & Chemical Corp. were preparing another round of output boosts in BPA country. A. Stephens Hutchcraft, Kaiser Aluminum president, was quick to say the restarts "do not eliminate the long term problems created by the new power rates announced by BPA.

"We still consider the new rates to be excessive and they doom the Northwest reduction plants to becoming swing capacity operated only when demand for aluminum is strong and prices high enough to cover the increased costs. These plants, unfortunately, will be among the first to be closed during downturns in the aluminum business cycle—and we must remember the aluminum business is a cyclical industry."

Meanwhile, there are other aluminum producers out there—most perhaps in the government-controlled or stand-alone camps—ready to fill any gaps in the U.S. supply.

Oscar Martinez, president of Venezuela's Interalumina, a director of the aluminum-producing company, Alcasa, and the architect of that nation's vertically integrating aluminum business, late last month called the U.S. the logical outlet for Venezuela's alumina and aluminum exports.

He was uncertain whether South American producers would sell aluminum via the upcoming Comex aluminum futures contract, but said, "Venezuela will play an important role and welcomes the advent of the Comex contract."

Asked if Venezuela was having much luck with the U.S. market currently, he quipped, "Oh, we are doing our best. We managed to sell 25,000 tons to Alcoa not too long ago."□

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METALWORKING ORDER TRENDS

Durable goods orders show improvement during August

Durable goods orders for August showed marked improvement over July's decline.

Overall orders received in August totaled $89.3 billion. This was up $1.1 billion, or 1.2 pct, over the July volume of $88.2 billion. It was also a modest increase compared with how July rose in relation to June. Nevertheless, all signs continue to point to a positive upturn in the economy. New orders for nonelectrical machinery in August increased $0.5 billion, about 3.2 pct, to $15.3 billion, with nearly all of the specific product lines showing rises.

The largest increase from July to August occurred in transportation equipment. Orders there were up $1.3 billion—6.2 pct—to $21.8 billion. But increases in the motor vehicle and parts and aircraft industries were partially offset by a decline in shipbuilding, construction, and mining and material handling equipment.

New orders for nondefense capital goods in August increased $1.4 billion, or 6.4 pct, to $23.0 billion after an 11.2 pct decline in July.

The renewed rise in orders in August following July's drop "promises future advances" in shipments and production "though probably not as large as the exceptional gains registered earlier in the year," said Commerce Secretary Malcolm Baldrige.

The August orders-shipments data point to a speeding up of the pace of orders. During the month, incoming new orders exceeded shipments by almost $2 billion. This beefed up unfilled order backlogs and made producers more willing to rehire workers and step up production. Whenever that happens, inventories must be built up—and that means more orders flowing through the pipelines in metalworking markets.

In August, durable goods new orders totaled $89.3 billion; shipments made by these producers totaled $87.6 billion.

Another positive sign for future metalworking business activity is seen in the August data on inventories—up 0.5 pct to $170.5 billion. The August gain in inventories was slightly more than the 0.3 pct rise registered in July and significantly better than the zero gain logged from March through June.

All in all, if it hadn't been for a big lag in defense capital goods in August, the showing for the month would have been a banner one. But these defense goods orders, which often become bunched up, fell off by 34 pct in August from a hot July pace.

Source: U.S. Dept. of Commerce Billions of dollars, seasonally adjusted monthly total, unless otherwise noted		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
Capital Expenditures (Annual Rates)				
U.S. Industry, Total	3rd Qtr.	$313.0*	$293.4	$313.7
Manufacturing, Total	3rd Qtr.	117.4*	108.7	118.2
Manufacturing, Durable Goods	3rd Qtr.	53.0*	48.4	56.6
Mining Industry	3rd Qtr.	13.2*	10.9	14.5
Key Indicators, Durable Goods Manufacturing				
New Orders	Aug.	89.3	88.2	73.3
Shipments	Aug.	87.6	85.6	77.0
Inventories	Aug.	170.5	169.6	183.4
Unfilled Orders	Aug.	309.6	307.9	290.5
New Orders, Metalworking				
Capital Goods Producers, Nondefense Industries	Aug.	22.9	21.5	19.3
Capital Goods Producers, Defense Industries	Aug.	4.5	6.9	5.3
Primary Metals, Total	Aug.	10.9	10.4	8.1
Steel (SIC 331)	Aug.	4.6	4.3	3.7
Iron & Steel Castings (SIC 332)	Aug.	1.1	1.2	0.7
Nonferrous Metals	Aug.	5.2	4.9	3.7
Nonelectrical Mach.-Equip. Industries, Total	Aug.	15.3	14.8	13.6
Engines & Turbines	Aug.	6.9	1.0	1.0
Farm Machinery & Equipment (Shipments)	Aug.	0.8	0.8	0.8
Construction, Mining & Materials Hdlg. Equip.	Aug.	2.2	2.5	2.1
General Industrial Machinery	Aug.	1.2	1.2	1.0
Fluid Power Equipment** (Index-1972=100)	Aug.	251	219	157
Metalworking Machinery	Aug.	0.8	0.6	0.7
Machine Tools, Total (Millions $, unadjusted)***	Aug.	137.2	175.1	86.5
Machine Tools, Metal-Cutting***	Aug.	91.0	128.7	60.4
Machine Tools, Metal-Forming***	Aug.	46.2	46.3	26.0
Electrical Mach. & Equip. Industries, Total	Aug.	13.5	14.7	11.6
Elec. Transmission Equip. & Industrial Apparatus	Aug.	1.9	1.7	1.4
Household Appliances	Aug.	1.3	1.2	1.1
Communication Equipment	Aug.	3.9	4.4	4.3
Transportation Equip. Industrial, Total	Aug.	21.7	20.4	15.7
Motor Vehicles & Parts (Shipments)	Aug.	14.6	12.7	11.0
Aircraft, Missiles & Parts	Aug.	5.4	5.0	5.2
Shipbuilding & Military Tanks	Aug.	0.2	1.6	0.8
Fabricated Metal Products, Total	Aug.	10.1	9.8	9.7
Instruments, Total	Aug.	4.0	4.4	3.8

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA.

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MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	159	175	175	228
Buffalo	26	30	30	59
Pittsburgh	204	202	184	317
Youngstown	114	104	94	140
Cleveland	143	139	141	164
Detroit	143	104	97	148
Chicago	475	480	472	495
Cincinnati	103	102	97	105
St. Louis	70	69	64	87
Southern	140	141	136	216
Western	87	95	93	136
U.S. Production	1,664	1,641	1,583	2,095

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective October 10, 1983)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1983	To Date 1982
Net tons, in thousands	1,664	1,641	63,024	58,531
Capability Utilization Rate	57.7	56.9	54.3	49.4

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 9/1/83)	26.822	26.822	26.822	25.195
Pig Iron* * (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$203.00
Scrap No. 1 hvy.* * * (Gross ton = 2240 lbs.)	$ 77.50	$ 77.50	$ 77.17	$ 82.17
No. 2 bundles	$ 46.50	$ 46.50	$ 45.50	$ 57.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 82.50	$ 82.50	$ 82.50	$ 94.50
No. 1 steel, Philadelphia	70.50	70.50	69.50	70.50
No. 1 steel, Chicago	79.50	79.50	79.50	81.50
No. 1 bundles, Detroit	81.50	81.50	75.50	83.50
Low Phos., Youngstown	84.50	84.50	84.50	95.50
No. 1 mach'y cast., Pgh	74.50	74.50	74.50	94.50
No. 1 mach'y cast., Phila	95.50	95.50	95.50	117.50
No. 1 mach'y cast., Chi	109.50	109.50	109.50	120.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

* *Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

* * *Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective October 10, 1983)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	81.00	76.00-81.00	9/27/83
Copper (C)	70.00-72.00	69 50-72.00	10/7/83
Lead	25.00	23.00-25.00	9/26/83
Magnesium Ingot	138.00	134.00-138.00	6/1/83
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	46.00	43.00-46.00	8/30/83

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $215.00
Beryllium-copper, per lb. cont. Be $130.00
Beryllium 97% powder 200 ..... $178.00
Bismuth, ton lots ..... $1.85-$1.95
Cadmium, ton lots $1.25
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $397.40
Indium, dollars per troy oz ..... $3.20-$3.50
Iridium, dollars per troy oz..... $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$330-$350
Molybdenum, lb. tech. moly oxides, 20 lb. MO can $5.85
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz..... $10.425
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Oct. 3—573.34 Oct. 6—573.04
Oct. 4—572.50 Oct. 7—Holiday
Oct. 5—572.21

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	69⅜	65½
Yellow brass	61⅛	60
Red brass	65⅛	62
Comm. bronze	66⅜	63
Mang. bronze	62⅜	58¾
Free cutting rod ends	59	58

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	63
No. 2 copper wire	53
Light copper	44

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	59
No. 2 copper wire	49
Light copper	40
No. 1 composition	54
No. 1 comp. turnings	53
Hvy. yellow brass solids	36
Hvy. yellow brass turnings	29
Radiators	45

Aluminum

New mixed clips	50	—51
Old sheet	48	—49
Old cast	48	—49
Clean dry borings	48	—49

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	41	—42
Mixed L.C. clips	35	—36
Old sheets and cast	33	—34
Borings and turnings	24	—25
Duraluminum clippings	29	—30

Copper and Brass

No. 1 copper wire	56	—57
No. 2 copper wire	49	—50
Light copper	44	—45
Radiators	36	—37
No. 1 composition	45	—46
No. 1 composition turn'gs	43	—44
Cocks and faucets	32	—33
Clean heavy yellow brass	30	—31
Brass Pipe	31	—32
New soft brass clippings	44	—45

Lead

Heavy soft lead	8	— 9
Whole batteries	3	— 4
Type metal	15	—16
Electrotype	13	—14

Nickel

Nickel solids	110	—120
Nickel rod ends	110	—120
Nickel sheets, clips	110	—120
Nickel turnings	50	— 60

Zinc

New zinc clippings	15	—16
Old diecast zinc	9	—10

EFFECTIVE OCTOBER 10, 1983

MATERIALS NEWSFRONT

(Effective October 10, 1983) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 82.00	to	$ 83.00
No. 2 hvy. melting	72.00	to	73.00
No. 1 dealer bundles	99.00	to	100.00
No. 1 factory bundles (auto)	102.00	to	103.00
No. 2 bundles	51.00	to	52.00
No. 1 busheling	97.00	to	98.00
Machine shop turn.	14.00	to	15.00
Shoveling turnings	39.00	to	40.00
Cast iron borings	38.00	to	39.00
Low phos. punchings plate	99.00	to	100.00
Heavy turnings	72.00	to	73.00
No. 1 RR hvy. melting	99.00	to	100.00
Rails 2 ft. and under	101.00	to	102.00
Scrap rails, random lgth.	91.00	to	92.00
RR specialties	100.00	to	101.00
No. 1 machinery cast	74.00	to	75.00
Cupola cast	67.00	to	68.00
Heavy breakable cast	30.00	to	31.00
Stainless			
18-8 bundles and solids	600.00	to	610.00
18-8 turnings	500.00	to	510.00

Chicago

No. 1 hvy. melting	$ 79.00	to	$ 80.00
No. 2 hvy. melting	72.00	to	73.00
No. 1 dealer bundles	98.00	to	99.00
No. 1 factory bundles (auto)	102.00	to	103.00
No. 2 dealer bundles	44.00	to	45.00
No. 1 busheling	97.00	to	98.00
Shredder scrap	85.00	to	86.00
Machine shop turn.	25.00	to	26.00
Mixed bor. and turn.	26.00	to	27.00
Shoveling turnings	31.00	to	32.00
Cast iron borings	44.00	to	45.00
Low phos. forge crop	99.00	to	100.00
Low phos. punchings plate ¼ in. and heavier	109.00	to	110.00
Low phos. 2 ft. and under	105.00	to	106.00
No. 1 RR hvy. melting	94.00	to	95.00
Scrap rails, random lgth.	81.00	to	82.00
Reroller rails	95.00	to	96.00
Rails, 2 ft. and under	102.00	to	103.00
RR couplers and knuckles	92.00	to	93.00
RR car axles	114.00	to	115.00
No. 1 machinery cast	109.00	to	110.00
Cupola cast	97.00	to	98.00
Stove plate	92.00	to	93.00
Steel car wheels	98.00	to	99.00
Stainless			
18-8 bundles and solids	570.00	to	580.00
18-8 turnings	470.00	to	480.00
430 bundles and solids	135.00	to	140.00
430 turnings	100.00	to	105.00

Philadelphia

No. 1 hvy. melting	$ 69.00	to	$ 72.00
No. 2 hvy. melting	57.00	to	60.00
No. 1 dealer bundles	82.00	to	85.00
No. 2 dealer bundles	42.00	to	45.00
No. 1 busheling	82.00	to	85.00
Shredder scrap	83.00	to	86.00
Machine shop turn.	23.00	to	26.00
Mixed bor. and turn.	23.00	to	26.00
Shoveling turnings	40.00	to	43.00
Low phos. 5 ft. and under	80.00	to	83.00
Low phos. 2 ft. punchings	92.00	to	95.00
Electric furnace bundles	97.00	to	100.00
RR specialties	81.00	to	84.00
Rails, 2 ft. and under	94.00	to	97.00
Cupola cast	62.00	to	65.00
Heavy breakable cast	53.00	to	56.00
No. 1 machinery cast	94.00	to	97.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 59.00	to	$ 60.00
No. 2 hvy. melting	57.00	to	58.00
No. 1 dealer bundles	81.00	to	82.00
No. 2 bundles	40.00	to	41.00
No. 1 busheling	79.00	to	80.00
Drop forge flashings	55.00	to	56.00
Machine shop turn.	33.00	to	34.00
Mixed borings and turn.	22.00	to	23.00
Shoveling turnings	33.00	to	34.00
Cast iron borings	33.00	to	34.00
Heavy breakable cast	35.00	to	36.00
Mixed cupola cast	51.00	to	52.00
Automobile cast	74.00	to	75.00
Stainless			
18-8 bundles and solids	470.00	to	480.00
18-8 turnings	350.00	to	360.00
430 bundles and solids	115.00	to	125.00

Youngstown

No. 1 hvy. melting	$ 71.00	to	$ 74.00
No. 2 hvy. melting	49.00	to	52.00
No. 1 dealer bundles	87.00	to	90.00
No. 2 dealer bundles	37.00	to	40.00
Machine shop turn.	3.00	to	5.00
Shoveling turnings	7.00	to	10.00
Low phos. plate	83.00	to	86.00
Electric furnace bundles	78.00	to	81.00
Galvanized bundles	70.00	to	73.00

Cleveland

No. 1 hvy. melting	$ 67.00	to	$ 70.00
No. 2 hvy. melting	32.00	to	35.00
No. 1 dealer bundles	85.00	to	88.00
No. 1 factory bundles	97.00	to	100.00
No. 2 bundles	22.00	to	25.00
No. 1 busheling	84.00	to	87.00
Machine shop turn.	1.00	to	4.00
Mixed bor. and turn.	1.00	to	4.00
Shoveling turnings	3.00	to	6.00
Cast iron borings	6.00	to	9.00
Cut structural & plates, 2 ft. and under	100.00	to	103.00
Low phos. punchings plate	100.00	to	103.00
Drop forge flashings	37.00	to	40.00
Foundry steel, 2 ft. & under	57.00	to	60.00
No. 1 RR hvy melting	77.00	to	80.00
Rails, 2 ft. and under	105.00	to	108.00
Rails, 18 in. and under	106.00	to	109.00
Steel axle turnings	67.00	to	70.00
Railroad cast	80.00	to	83.00
No. 1 machinery cast	87.00	to	90.00
Cupola cast	60.00	to	63.00
Stove plate	45.00	to	48.00
Stainless			
18-8 bundles	325.00	to	335.00
18-8 turnings	275.00	to	285.00
430 bundles	80.00	to	85.00

Buffalo

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 58.00	to	$ 59.00
No. 2 hvy. melting	47.00	to	48.00
No. 1 busheling	69.00	to	70.00
No. 1 dealer bundles	69.00	to	70.00
No. 2 bundles	30.00	to	31.00
Machine shop turn.	12.00	to	13.00
Mixed bor. and turn.	13.00	to	14.00
Shoveling turnings	17.00	to	18.00
Cast iron borings	12.00	to	13.00
Low phos. plate	69.00	to	70.00
Structural and plate, 2 ft. and under	70.00	to	71.00
Rails, 2 ft. and under	78.00	to	79.00
Scrap rails, random lgth.	62.00	to	63.00
No. 1 machinery cast	67.00	to	68.00
No. 1 cupola cast	48.00	to	49.00

St. Louis

No. 1 hvy. melting	$ 69.00	to	$ 70.00
No. 2 hvy. melting	58.00	to	59.00
Foundry steel, 2 ft.	57.00	to	58.00
No. 1 dealer bundles	69.00	to	70.00
No. 2 bundles	55.00	to	56.00
Machine shop turn.	17.00	to	18.00
Shoveling turnings	24.00	to	25.00
Cast iron borings	35.00	to	36.00
No. 1 RR hvy. melting	79.00	to	80.00
Rails, random length	76.00	to	77.00
Rails, 18 in. and under	92.00	to	93.00
RR specialties	85.00	to	86.00
Cupola cast	70.00	to	71.00
Heavy breakable cast	48.00	to	49.00
Stove plate	75.00	to	76.00
Cast iron car wheels	49.00	to	50.00
Rerolling rails	97.00	to	98.00
Unstripped motor blocks	57.00	to	58.00

Birmingham

No. 1 heavy melting	$ 70.00	to	$ 71.00
No. 2 heavy melting	64.00	to	65.00
No. 1 dealer bundles	71.00	to	72.00
No. 2 bundles	50.00	to	51.00
No. 1 busheling	71.00	to	72.00
Shredder scrap	91.00	to	92.00
Machine shop. turn.	24.00	to	25.00
Shoveling turnings	32.00	to	33.00
Cast iron borings	33.00	to	34.00
Electric furnace bundles	67.00	to	68.00
Elec. furnace, 3 ft. & under	64.00	to	65.00
Structural and plate, 2 ft.	94.00	to	95.00
Structural and plate, 4 ft.	90.00	to	91.00
No. 1 RR hvy. melting	71.00	to	72.00
Scrap rails, random lgth.	81.00	to	82.00
Rails, 18 in. and under	94.00	to	95.00
Angles and splice bars	88.00	to	89.00
No. 1 cupola cast	84.00	to	85.00
Unstripped motor blocks	64.00	to	65.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 62.00	to	$ 63.00
No. 2 hvy. melting	55.00	to	56.00
No. 1 dealer bundles	71.00	to	72.00
No. 2 bundles	30.00	to	31.00
Machine shop turn.	7.00	to	8.00
Shoveling turnings	10.00	to	11.00
Cast iron borings	14.00	to	15.00
Low phos. 18 in. and under	89.00	to	90.00
Rails, random length	70.00	to	71.00
Rails, 2 ft. and under	88.00	to	89.00
No. 1 cupola cast	67.00	to	68.00
Heavy breakable cast	34.00	to	35.00
Drop broken cast	80.00	to	81.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 34.00	to	$ 35.00
No. 2 hvy. melting	30.00	to	32.00
No. 2 dealer bundles	22.00	to	23.00
Mixed bor. and turn.	7.00	to	8.00
Machine shop turn.	4.00	to	5.00
Shoveling turnings	10.00	to	12.00
Clean cast, chem. borings	34.00	to	35.00
No. 1 machinery cast	89.00	to	90.00
Mixed yard cast	38.00	to	39.00
Heavy breakable cast	14.00	to	15.00
Stainless			
18-8 prepared solids	490.00	to	510.00
18-8 turnings	390.00	to	410.00
430 prepared solids	70.00	to	80.00
410 solids	60.00	to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 45.00	to	$ 47.00
No. 2 hvy. melting	35.00	to	37.00
No. 1 dealer bundles	57.00	to	59.00
No. 2 bundles	31.00	to	33.00
No. 1 busheling	57.00	to	59.00
Shredder scrap	57.00	to	59.00
Machine shop turn.	5.00	to	7.00
Shoveling turnings	9.00	to	11.00
No. 1 machinery cast	95.00	to	100.00
Mixed cupola cast	34.00	to	36.00
Heavy breakable cast	8.00	to	10.00

San Francisco

No. 1 hvy. melting	$ 42.00	to	$ 44.00
No. 2 hvy. melting	34.00	to	36.00
No. 1 dealer bundles	29.00	to	31.00
No. 2 dealer bundles	13.00	to	15.00
Machine shop turn.	6.00	to	8.00
Cast iron borings	6.00	to	8.00
No. 1 cupola cast	85.00	to	87.00

Los Angeles

No. 1 hvy. melting	$ 40.00	to	$ 42.00
No. 2 hvy. melting	29.00	to	31.00
No. 1 dealer bundles	27.00	to	29.00
No. 2 dealer bundles	10.00	to	12.00
Machine shop turn.	6.00	to	8.00
Shoveling turnings	10.00	to	12.00
Cast iron borings	6.00	to	8.00
Elec. furnace, 1 ft. and under (foundry)	85.00	to	87.00
No. 1 cupola cast	87.00	to	89.00

Seattle

No. 1 hvy. melting	$ 61.00	to	$ 63.00
No. 2 hvy. melting	50.00	to	52.00
No. 2 bundles	40.00	to	42.00
No. 1 cupola cast	96.00	to	98.00
Mixed yard cast	83.00	to	85.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 60.00
No. 2 heavy melting cut 2 ft. and under	57.00
No. 1 dealer bundles	65.00
No. 2 bundles	35.00
Mixed steel scrap	39.00
Bush. new fact. prep'd.	63.00
Bush. new fact. unprp'd.	55.00
Machine shop turn.	30.00
Short steel turn.	33.00
Mixed bor. and turn.	20.00
Cast scrap	53.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 79.00	to	$ 80.00
No. 2 hvy. melting	63.00	to	65.00
No. 2 bundles	41.00	to	43.00
Machine shop turn.	21.00	to	22.00
Crushed turnings	43.00	to	45.00
Shredder scrap	79.00	to	80.00
Cut structural plate 2 ft. and under	94.00	to	96.00
Unstripped motor blocks	57.00	to	59.00
Cupola cast	78.00	to	80.00